January 19, 1948

STEEL

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The Magazine of Metalworking and Metalproducing

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EDITORIAL INDEX PAGE 29

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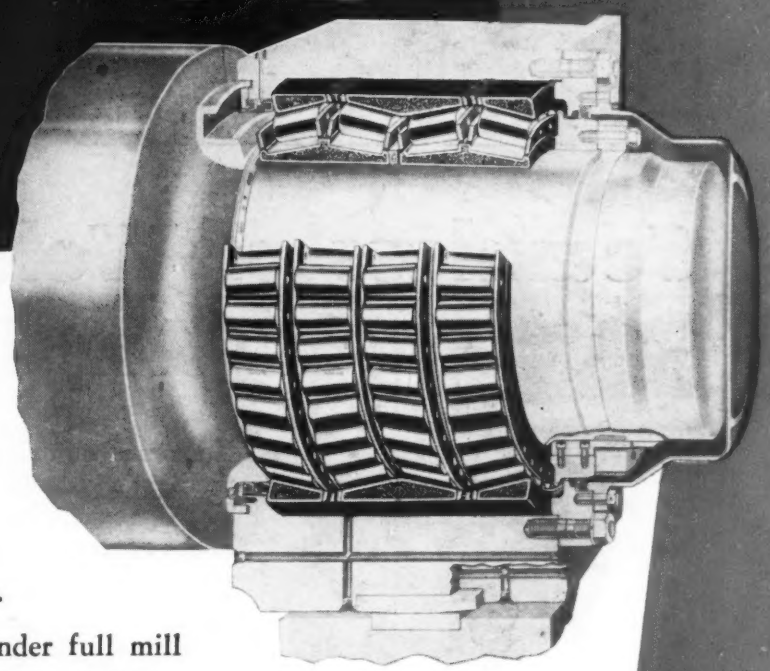

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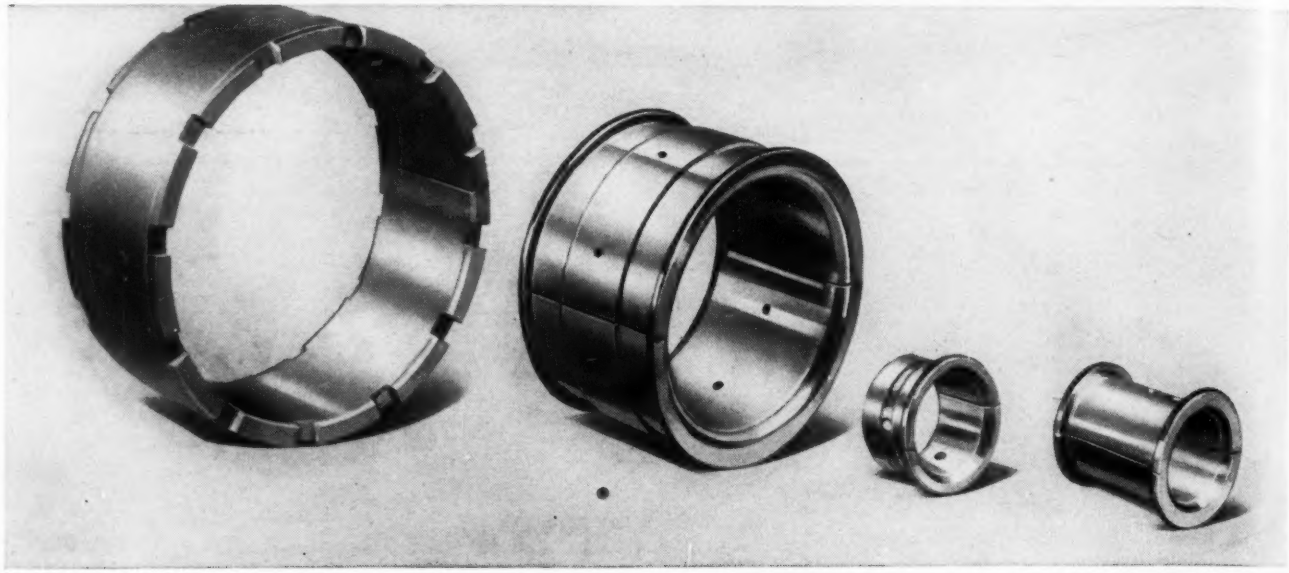

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High-Temp Alloy Iron Titration
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STEEL

The Magazine of Metalworking and Metalproducing

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Here's How We're Going to Have More Steel for You . . . .

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That our Detroit mill . . . our Reliance Division network and our Craine-Schrage Steel Division will continue to do everything possible to keep your production rolling . . giving every account equitable consideration . . . constantly planning and working toward greater production and supply . . . and towards higher standards of steel service.

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January 19, 1948

Perpetual Emergency

Last Wednesday, as President Truman's annual "economic" report was being presented to Congress, two cabinet members disclosed to the Senate Banking committee what they would do if the President's demand for stand-by price control authority were granted.

Secretary of Interior Krug said he would immediately order a 60-day "freeze" of retail and wholesale prices for coal, fuel oil, gasoline and other petroleum products. Secretary of Commerce Harriman declared he would place price ceilings on steel, textiles, lumber and farm machinery.

What would happen if these price controls were imposed? Right off the bat we would have a situation wherein a few items were in price strait jackets while all others were free. Immediately, affected producers and manufacturers, many of whom have not yet absorbed past and current increases in costs, would attempt to shift from unprofitable to profitable lines of activity. Where there was no opportunity to shift, plants would be threatened with losses and eventual shut-down.

At this stage, the third round of wage increases would be coming up and there would be work stoppages or demands for wage controls, or both. By this time production would have fallen off to the point where Washington would be asking for federal subsidies to entice idle plants back into production. Meanwhile the effect of curtailed production upon consumers would have caused Washington planners to reinstate rationing. Simultaneously the original price controls—intended to apply only to steel, coal, oil, textiles, lumber and farm machinery—would have been extended to cover practically everything.

In short, we would find ourselves in the grip of a planned economy more drastic than any imposed even in wartime. It would be an economy in which each new remedy for an existing emergency brought about a new emergency which would become an excuse for introducing still more remedies. Once launched upon this treadmill of perpetual national emergency during peacetime, there is grave doubt as to whether we could ever regain a free economy.

A better way to combat inflation is to recognize the fact that our present smooth-running high production is our strongest ally and to work with and not against it toward the goal of lower prices and greater stability.

* * *

INFLATION ANTIDOTE: In connection with the final paragraph above, it is too bad that some of the persons in Washington who put so much faith in official directives and paper work as weapons against inflation were not present last week at the 1948 annual convention of the Society of Automotive Engineers in Detroit or at the second National Materials Handling Exposition in Cleveland. At either event they would have seen and heard many things that would have convinced them that more efficient production is the key to solution of inflation.

At the SAE meeting, W. E. Jominy compared the alloy steels used in the automotive industry 25 years ago with those used today. "It is apparent," he concluded, "that we have found it possible to use much cheaper alloy steels today than were used in our early experience." In the keynote address at the materials handling conference held in connection with the Cleveland exposition, Ezra W. Clark declared that improved materials handling is an effective way "to break the log jam of inflation. The way to combat rising costs," he said, "is to achieve a

(OVER)

higher per capita production along with more efficient handling methods."

These quoted statements deal with only two of hundreds of ways in which industry is constantly striving to produce more goods at less cost for more people. If we try to work with the current of efficient production, instead of trying to thwart it by bureaucratic restrictions, we will begin to make progress in our battle against inflation. —pp. 37, 40, 43

* * *

NOTEWORTHY EXPANSION: Official figures by the American Iron & Steel Institute show that production of ingots and steel for castings in 1947 totaled 84,787,501 net tons. Steelmaking capacity on Jan. 1, 1947 was 91,241,250 tons and on Jan. 1, 1948 it was 94,233,640 tons. This gain of nearly 3 million tons in 1947 will be followed by another gain of 2 million tons by the end of 1949. Blast furnace capacity, which was 65,709,200 tons on Jan. 1, 1947, stood at 67,438,930 tons as of Jan. 1, 1948, a gain of about 1,730,000 tons for 1947. Almost 3 million tons of ironmaking capacity will be added in 1948.

These increases in capacity are far above the normal expansion in peacetime years and are especially noteworthy in view of the difficulties which attend the construction of plant and equipment under present circumstances.

—p. 38

* * *

EVERBODY NEEDS PIPE: Each day brings news which emphasizes the unprecedented demand for pipe and tubing. It may be an estimate of more homes to be built in 1948, reports on the growing acceptance of radiant heating, statistics on more oil heating installations for homes, figures on the replacement of steam locomotives by diesels or announcements of new pipe line projects.

Or—as happened a few days ago—it may be the discovery of a new oil field. M. L. Benedum's Alford No. 1 well in West Texas is said to open a new reserve of crude estimated at from 200 to 600 million barrels. A strike of this magnitude will stimulate wildcatting and may lift the number of new wells in 1948 above the high total of 33,000 drilled in 1947.

These developments point to a continued tight situation in the supply of standard pipe, oil country goods and line pipe. The peacetime production record of 6 million tons of pipe and tubing in 1947 may be exceeded in 1948, but the margin will be small unless more semifinished steel can be made available to pipe and tube mills. —pp. 48, 104

* * *

TOMORROW'S MARKETS: In these days of shortages, one wonders how many attractive new or expanding markets for steel or other scarce materials are being neglected simply because manufacturers do not have the materials which would permit them to develop and supply such markets.

Several cases in point are found on American farms. Numerous companies engaged in fabricating farm buildings of sheet steel are not supplying the demand properly because of lack of steel. A Department of Agriculture engineer recently designed six experimental corn dryers, which were built by six farm equipment manufacturers. These dryers, when finally perfected, will help conserve grain and when the supply of flat rolled steel becomes plentiful, they may constitute a promising new market for fabricated sheet products.

Manufacturers and fabricators should be watching opportunities of this kind closely. Some of them will pay dividends at a future time when materials are more easily obtainable.

—p. 46

* * *

RECOVERY IS SPEEDY: One way to test the pulse of American industrial production is to note the manner in which important barometers of production react after holidays or other interruptions. When business is going along at a healthy pace, these barometers snap back quickly after the interruption. When business is ailing, the recovery is slow and sometimes indecisive.

In the first two weeks of the new year, most important business indicators had snapped back to near postwar peak levels. Steel ingot output, electric power output, bituminous coal production, construction volume and automobile assemblies all are at levels that compare favorably with those existing a month ago. Only revenue freight car loadings lag somewhat behind the pre-holiday average. This publication's industrial production index recovered more sharply after the year-end lull this year than it did a year ago. —p. 56

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

ALLOCATIONS—Metalworking companies eyeing the new voluntary allocations plan in hope their steel procurement problem will be eased are mostly doomed to disappointment. For every consumer who is helped under the program (p. 37), there will be scores whose difficulties will be increased. Meanwhile the administration continues to put pressure on Congress for compulsory allocations, priorities and price control. Some Washington observers believe it is only a matter of time until this authority is granted.

CAPACITY UP—Nearly 3 million tons of steel ingot capacity was added during 1947 and 2 million more tons will be completed by the end of 1949 (p. 38), marking one of the greatest steel expansions in peacetime history. Rated capacity at the beginning of the year was 94,233,640 tons. Shortage of metallics, however, is preventing full utilization of these facilities. Blast furnace and coke oven capacity is being increased substantially. Despite the raw materials scarcity, final figures show the industry produced 84,787,501 net tons of ingots and castings, far more than made in any previous peacetime year. Current production is at 98 per cent of capacity, highest for several years.

MATERIALS HANDLING—Improved materials handling methods offer one of the few ways in which management can reduce costs and combat inflation. This is the consensus of equipment manufacturers who last week (pp. 40, 42) showed their wares in Cleveland's Public Auditorium.

STEEL PRICING—Hearings in the Federal Trade Commission's complaint against steel industry pricing policies opened Jan. 12 in Washington, with government counsel outlining the philosophy behind the action (p. 39). Next day, hearings were recessed to Feb. 2 to allow respondents to collect data requested by the government. Prospects are for a long and tedious hearing.

WAR TO PEACE—Progress the automotive industry is making in applying wartime developments in vehicles, machines, tools, materials and methods to peacetime products was revealed (p. 43) in sessions of the Society of Automotive Engineers in Detroit. Among other things, the engineers were told the public votes 3 to 4 for small, light cars.

PIPE SUPPLY—Prospects for improvement in pipe supply during 1948 are not too encouraging (p. 48). Although the industry established a new peacetime record by making about 6 million tons in 1947, supply was not adequate to meet demand. A shortage of steel will prevent any great increase this year.

FOREIGN—French metalworking production figures are showing the disastrous effects of that country's political and labor turmoil. Overall loss of output in November (p. 47) is estimated at 15 to 30 per cent. Belgium and Luxemburg are continuing to develop their export trade. Denmark is building a new mill which will double output of ship plates. Many European countries are counting on steel supplies from the United States.

SIGNS OF THE TIMES—New export licensing policy (p. 44) gives some clues as to the mechanics of distribution of metal products under the European Recovery Program. . . . Harry Ferguson's suit (p. 51) against Ford Motor Co. gains attention by the amount of damages, $251 million, asked, but is not taken too seriously. . . . If Columbia Steel Co.'s purchase of surplus aluminum plant in California is approved by the Justice Department, the company will be enabled to put its new cold rolling mill into production months earlier than expected (p. 54). . . . Retail and wholesale prices (p. 56) continue to push upward to new highs. . . . A new product opportunity is seen (p. 46) in drying equipment for farm crops. . . . Freight computation for steel tubing is facilitated (p. 54) by a new table published by American Steel Warehouse Association.

Engineering News, P. 65 *Market Summary, P. 119*

Manufacturer Flies Ryerson Engineer to Plant . . .

and returns him with problem solved

A machinery manufacturer faced an emergency. He was changing over to flame-cut steel plate for many parts previously cast. In the process of change-over, unforseen production problems threatened to stall his entire operation. Committed to a heavy schedule of deliveries, he saw the threat of reduced volume as an inconvenience to customers—a mark against his company.

Moving swiftly against time, he called Ryerson in a neighboring state, offering to send his company plane if a Ryerson specialist would make a flying trip to his plant. We agreed, and, in a matter of hours, a Ryerson engineer was on the spot giving practical assistance.

By simplifying several parts, engineering difficulties were avoided. Standardization of other parts reduced cost and made better use of available steel. There was no slow-down in production.

As our specialist was flown back that same day, he made out a report covering his activities. It was brief enough. It read: Customer service.

That brief report—customer service—sums up the reason so many steel users make Ryerson the first source for steel from stock and turn to us in time of trouble. Despite steel shortages there is no shortage in our willingness and ability to cooperate. Our technical men will gladly work with you on any steel problem, or assist in the search for a suitable alternate when needed steel is not available.

Remember that Ryerson facilities and experience are always at your service when you call.

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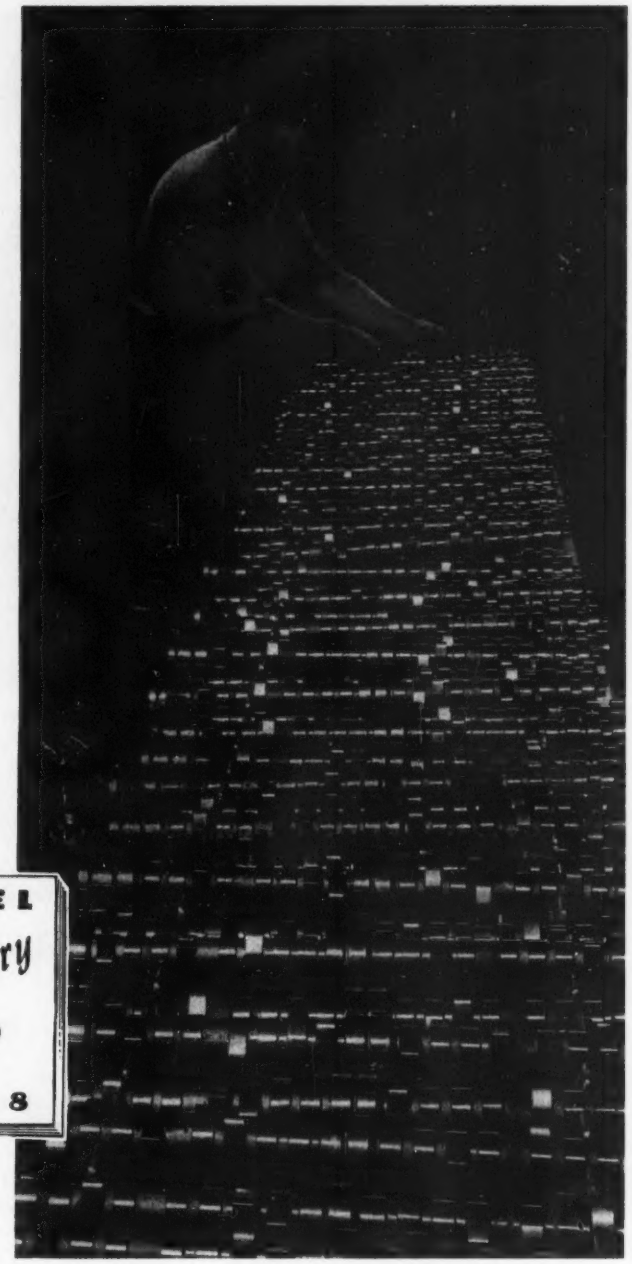
RYERSON STEEL

See Allocations Plan Aiding Few Steel Consumers

Many ask but few will receive help in procurement problems under program now being formulated. Tonnage of steel to be channeled into essential needs estimated at 3 million tons minimum. Administration again asks for stronger powers



Camshafts form an interesting pattern as they emerge from automatic grinders at Rouge plant of Ford Motor Co. More than 5000 are produced daily

FOR EVERY steel consumer whose procurement problems are eased under the voluntary allocations program now being formulated, scores of others will find their difficulties intensified.

This appears the most realistic conclusion to be drawn from the information available from government officials who are drafting the program under Public Law 395, the anti-inflation act passed by Congress at its special session.

Consumers not fortunate enough to obtain help under voluntary allocations will have to do exactly as at present; they will have to place their dependence as before upon their steel mill and warehouse suppliers.

For consumers other than those in the voluntary allocations program—a leading official told STEEL—the government "can have only sympathy."

If the thousand or more consumers who have appealed to the new Office of Industry Co-operation get any replies to their letters and telegrams, these replies will be dictated out of courtesy rather than in any attempt to render tangible assistance in providing more steel, castings, etc.

May Involve 3 Million Tons—Indications are that the priorities program now in the early stages of development will involve substantial steel tonnage. A "horseback" estimate places the total tonnage at a minimum of approximately 3 million tons of finished rolled products, with the likelihood that the program will grow. This 3 million ton figure, incidentally, applies to tonnage over and above the steel presently being shipped to the industries slated for priorities aid.

In discussing the prospects, government officials hope that the steel to be called for under the allocations program will be offset in two ways: By getting more scrap, coking coal, pig iron, semifinished steel, etc., to take certain steel facilities off the idle list, and by getting into production new steelmaking units slated to be completed at various times in 1948. At the same time, they emphasize that this is only a hope, and that it is safer to expect the allocations program to make substantial inroads into the supply of steel available for all nonpriority uses.

Compulsory Program Asked Again—While the machinery for the voluntary program is being set up, the administration continues its drive for a stronger compulsory program. President Truman in his economic message reiterated his demand for passage of his 10-point anti-inflation program, first presented at the special session. This would provide, in addition to compulsory allocations of basic industrial materials, for price and wage controls and rationing authority.

Secretary of Commerce W. A. Harriman told the Senate Banking & Currency Committee last week that stronger allocation and priority powers are needed. He doubted that voluntary allocations alone would take care of the situation.

One of the factors that steel con-

sumers should have in mind in assessing the voluntary allocations program is the real meaning behind the President's recent statement that allocations are necessary in the "national interest." The administration frequently has been criticized for failure to advise the people frankly about the extreme delicacy of the existing international situation. The term "national interest" as the justification of the allocations program definitely includes the angle of military preparations. The allocations program is aimed at much more than simply mending gaps in the peacetime economic fabric. It aims at putting the country in shape to meet another war emergency, if it comes.

Tentative Procedure — The blueprint calls for the following procedure to implement the voluntary allocations policy:

1—Needs for allocations assistance will be decided at the "top" level and usually will be assigned in a Presidential directive.

2—After a need has been directed to the attention of the claimant agency, there is to be an inter-agency meeting in the Office of Industry Co-operation, to review all angles with a view to outlining effective procedure.

3—The Office of Industry Co-operation will call in the affected industries and representatives of labor, state the need, and ask them to report programs to take care of the need.

4—The Office of Industry Co-operation, upon receipt of the programs from the representatives of industry and labor, will hold public hearings. Manufacturers, local labor organizations and other interested groups will have a chance to comment on the programs, criticize them and tell how they will be affected should the programs be adopted.

5—The programs, perhaps modified as a result of the public hearings, and in subsequent conversations with the industry representatives and the labor group, will be ordered into effect.

Despite the fact that the steel industry was the first to be called in and asked to put in a slate of names from which Secretary Harriman will select an Iron & Steel Industry Committee to handle voluntary allocations, the proceeding in steel was a little off the beaten path. The start was made on steel because steel is the universal material involved in all the allocations programs. The programs will start with those industries manufacturing the commodities and products whose production is to be increased.

Beneficiaries — So far the list of such commodities has been put together only in a preliminary way. At

(*Please turn to Page* 139)

Ben Fairless, left, United States Steel Corp. president, confers with Department of Commerce officials as plans for voluntary allocations of steel are formulated. Shown in photo, left to right: Mr. Fairless; Secretary of Commerce W. A. Harriman; John C. Virden, director of the Office of Industry Co-operation; William C. Foster, under secretary. Acme photo

Capacity Upped 3 Million Tons

NEARLY 3 million tons of steel ingot capacity was added by the industry during 1947, and an additional 2 million tons will be completed by the end of 1949, according to the American Iron & Steel Institute.

This represents one of the greatest peacetime expansions in history and when projected additions are completed capacity will exceed the wartime peak.

Blast furnace capacity was increased nearly 1,730,000 tons last year, 2,924,000 tons will be added this year, and 476,000 tons are projected for 1949.

Comparative figures for 1947 and 1948 follow (in net tons):

Steel ingots	
Jan. 1, 1948	94,233,640
Jan. 1, 1947	91,241,250
Blast Furnace	
Jan. 1, 1948	67,438,930
Jan. 1, 1947	65,709,200
Coke Ovens	
Jan. 1, 1948	62,505,840
Jan. 1, 1947	60,280,590

Record 1947 Steel Output Totals 84,787,501 Tons

Official tabulation of the record steel production in 1947 places the year's total at 84,787,501 net tons of ingots and steel for castings, according to the American Iron & Steel Institute.

This was far more steel than ever made before in a peacetime year and exceeded the output of 1946 by more than 18 million tons.

To produce the record tonnage, steel furnaces were operated at an average rate of 92.9 per cent of capacity. Thus, 1947 was the first peacetime year in which average operations exceeded the 90 per cent level. The output of the year was more than 6 million tons below the industry's 1947 capacity figure of 91,241,250 tons. Major obstacles to full operation of steel furnaces, reports the institute, included the lack and poor quality of scrap, as well as the poor quality of coking coals available.

Open hearth furnaces produced 90.6 per cent of the 1947 total tonnage. The peak month of production for the year was October, when more than 7,500,000 tons were turned out, with operations averaging 97.5 per cent of capacity. The peak quarter of the year was the final three months, when 22,162,966 tons were made, with operations averaging 96.4 per cent of capacity.

December's output of steel was

7,369,596 tons, with operations averaging 95.3 per cent of capacity.

Steel Pricing Hearings Recessed Until Feb. 2

Hearings in the Federal Trade Commission action against the steel industry's pricing policies were recessed last Tuesday until Feb. 2 to allow time for the respondents to produce price and basing point data asked by the government.

At the opening of the hearings Jan. 12, Lynn C. Paulson, the FTC trial attorney, outlined the philosophy behind the government's action.

The commission holds, he said, that the present pricing policies of the industry adversely affect the public interest. Western states are not getting the benefit of localized production because producers do not act independently and quote f.o.b. mill prices but defer to the industry as a group.

"Refusal of the respondents to sell f.o.b. mill is depriving many people located at some distance from the mill of an opportunity to obtain steel during this time of short supply.

"Why these respondents don't sell f.o.b. mill when requested to do so by a purchaser and why they don't have a price at every point of production will have to be answered in the course of the hearings."

11-Month Steel Payroll Tops Full Year Records

During the first 11 months of 1947, salaries and wages paid to employees of the steel industry totaled $1,811,378,000, more than paid out in any previous peace or war year by the industry. The figure slightly exceeded the $1,745,019,700 paid out in the peak war year of 1944. Payments to wage earners alone for the first 11 months of 1947 at $1,454,193,000 topped the total wages of $1,208,259,000 paid to steelworkers in 1946 by 20 per cent or $246,000,000.

Valley Mfg. Co. Is Hudson Subsidiary at Shenango

The hand sheet mill which Hudson Motor Car Co. will operate in the recently leased Shenango tin plate mill at New Castle, Pa., has been incorporated as Valley Mfg. Co., a Hudson subsidiary.

Hudson is now installing hand sheet equipment at the facility, once the world's largest tin mill. Operations are expected to begin about April 1, with an anticipated annual production of 100,000 tons of sheets.

Follansbee Steel Deal Probed

METALWORKING companies served by Follansbee Steel Corp., Pittsburgh, were disturbed last week by reports there was under way a deal that would change ownership or control of the company, and possibly disrupt their steel supplies.

Not only were the steel consumers apprehensive but they, along with Follansbee officials and members of financial circles, were puzzled as to who was involved in the purported deal and what the objectives were. The mystery even had a storybook atmosphere by the presence of an international angle.

Three-Way Investigation—So bizarre was the purported deal that a three-way official investigation was launched, with probes being made by the Securities & Exchange Commission, Attorney General Goldstein of New York state, and Emil Schram, president of the New York Stock Exchange. Meanwhile, reports emanated from New York that the deal had been called off.

For the past several weeks there have been rumors that Follansbee was to be sold, the reports following on the heels of the sale of a number of small, nonintegrated mills. However, from the beginning, Lauson Stone, Follansbee president, emphatically denied that company officials had knowledge of an impending sale.

Large Stock Purchase Reported—Climaxing the weeks of rumors concerning Follansbee, newspapers announced from New York last week that Alan Adams Haye, described as a United States citizen living in Europe, and associates had purchased control of Follansbee for $9,150,000. It was said the purchasing group acquired 183,000 shares of Follansbee stock from 625 Associates Inc. for $50 a share. This price aroused considerable discussion, for Follansbee stock closed on the New York Stock Exchange at 37¾ on Dec. 31.

Upon appearance of news stories that Follansbee had been sold there arose considerable speculation as to the motives back of the purported

(*Please turn to Page* 138)

Present, Past and Pending

■ HUDSON BUYS ADDITIONAL PLANT SPACE
DETROIT—Hudson Motor Car Co. has purchased from Fruehauf Trailer Co. a 200,000 sq ft plant adjacent to Hudson's body plant here. The property contains six buildings and will be used as additional Hudson manufacturing space.

■ KELLOGG DIVISION ADOPTS FIRM PRICE POLICY
NEW YORK—American Brake Shoe Co.'s Kellogg Division will adopt on Feb. 1 firm prices for all products to replace its policy of price in effect at time of shipment. The division makes air compressors and paint spray equipment.

■ ASSEMBLY LINE SPEEDS FREIGHT CAR PRODUCTION
CHICAGO—American Car & Foundry Co. has accelerated freight car production here by installing an assembly line based on new methods of manufacture. Automatic welding techniques are coupled with use of pneumatic clamps and adjustable frames to hold parts during welding.

■ TO AUGMENT COKE SUPPLY BY OPENING NEW MINE
PITTSBURGH—To augment metallurgical coke supply for its Chicago district operations, U. S. Steel Corp. through its U. S. Coal & Coke Co. will develop and completely mechanize a new coal mine at Lynch, Ky.

■ SECOND QUARTER TIN PLATE EXPORT QUOTAS SET
WASHINGTON—Export tin plate quotas for second quarter have been set at 125,000 net tons, down 17,000 tons from first quarter. Quota includes 112,000 tons of rated tonnage. Requests for second quarter totaled 201,694 tons and the reduction was made to conserve tin for stockpiling purposes.

■ ALL COMMODITIES TO REQUIRE EXPORT LICENSES
WASHINGTON—Beginning Mar. 1, shipments of all commodities to Europe will require individual validated export licenses.

SUNOCO
PRODUCTION ARTS, INC.

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STANLEY
STEEL STRAPPING

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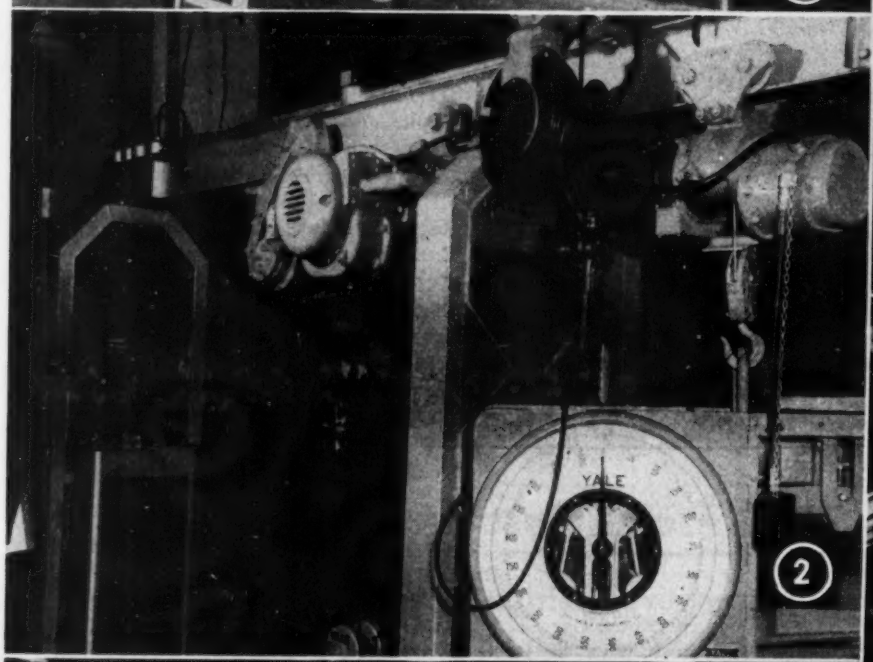
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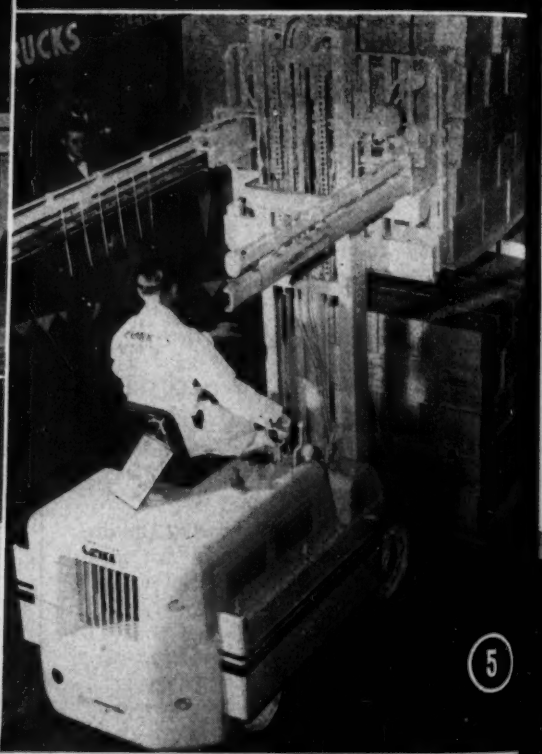
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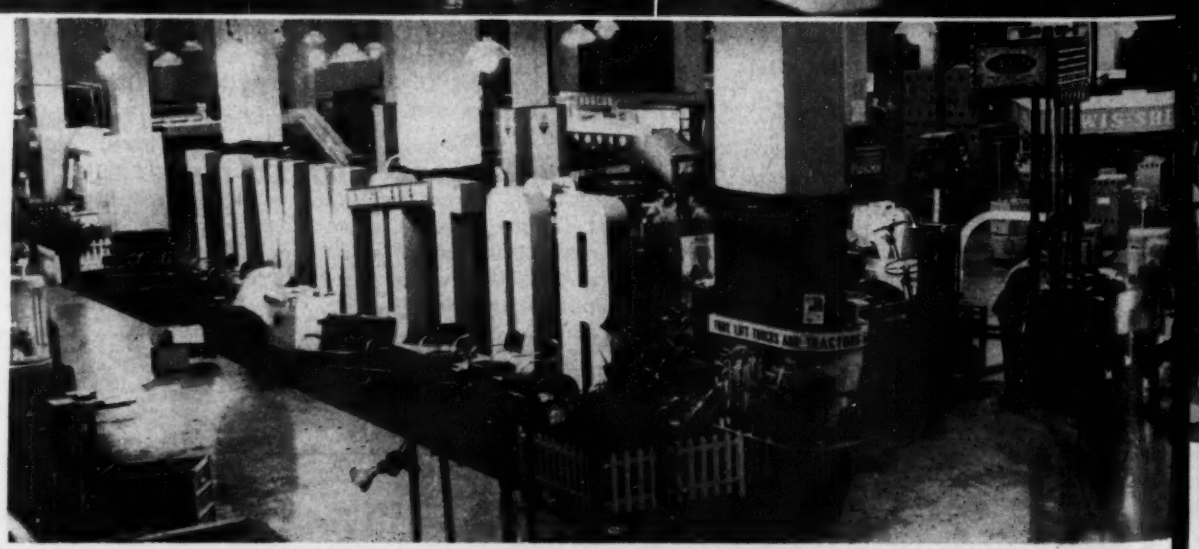

TOWMOTOR

Better Materials Handling

....Inflation Antidote

Fig. 1—This belt conveyor line actually is feed-in end of an automatic pallet loader which palletizes filled shipping containers after taking them directly from conveyor

Fig. 2—Foreground shows a crane scale for steel mill weighing applications. At left is an overhead hoist featuring a motorized trolley

Fig. 3—Girl shows visitors ease with which load can be pulled out of simulated box car with this motorized hand truck. Load being pulled is assembled on expendable pallet developed by Addison-Semmes, Racine, Wis. Giant tractor, left, "manhandles" 30,000-pound steel coils.

Fig. 4—Effective method for long-distance packaging—steel strapping—is no longer a chore when using modern strapper

Fig. 5—Low-cost palletizing is dramatized in this exhibit. Loads literally are carried on thin sheet of paper

Fig. 6—Overall view of corner of show. Some exhibitors were still making minor booth adjustments when photo was made

Fig. 7—Hand on throttle, operator puts through its paces this load dispatcher designed for maneuverability

Fig. 8—Closeup view of conveyor developed by Jervis B. Webb Co., Detroit

ALL TYPES of modern materials handling equipment and methods—engineered to increase the productivity of workers, enable unskilled men to do semiskilled jobs and to cut deeply into the end costs of manufactured products—were demonstrated to 15,000 visitors at the second National Materials Handling Exposition in Cleveland's Public Auditorium Jan. 12-16.

Occupying space three times that of last year's exhibit, the show—held concurrently with a conference on materials handling—presented under one roof virtually every type of handling equipment available today. To company executives among the visitors, it presented the best opportunity to date of comparing and studying the equipment which might solve their particular problems regarding materials handling.

Displayed at the show were pallets of all types and varied means of packaging as aids to transporting materials via hand trucks, both manual and motorized, lift trucks ranging up to the giant size, in addition to many different designs of roller and belt conveyors, suspended and overhead automatic systems.

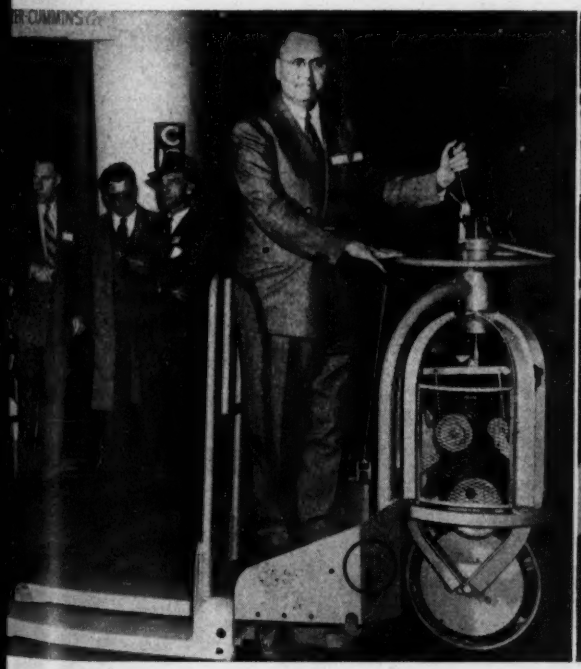
Attracting much attention were a ram type coil tractor capable of raising and transporting 30,000-pound steel coils, and a display of tiny models depicting various materials handling devices, operated by remote control.

Ezra W. Clark, materials handling consultant of Battle Creek, Mich., in his keynote address to the handling conference declared that materials handling is about the only means left to "break the log jam of inflation." The way to combat rising costs, he said, "is a higher per capita production along with more efficient handling methods."

Warehousemen, as storage and distribution service experts, are

(*Please turn to Page* 138)

STEEL Staff Photos



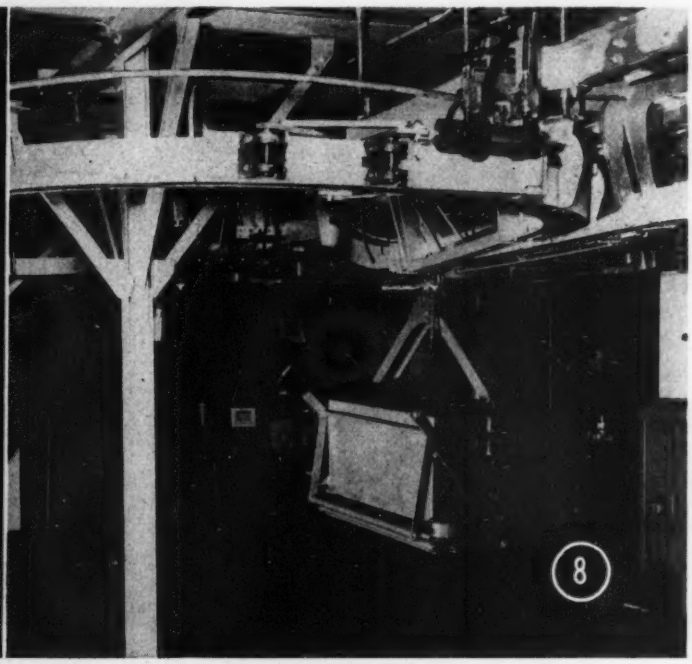


Fig. 9—At the Electric Industrial Truck Association booth, visitors were intrigued by the remotely-operated miniature models

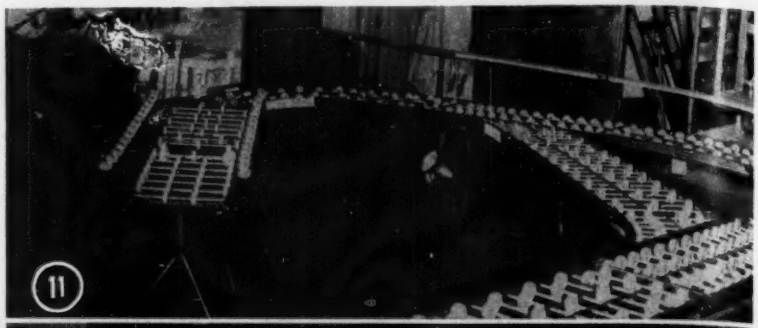
Fig. 10—This lift truck is spotting and tiering a load assembled on a steel-type pallet

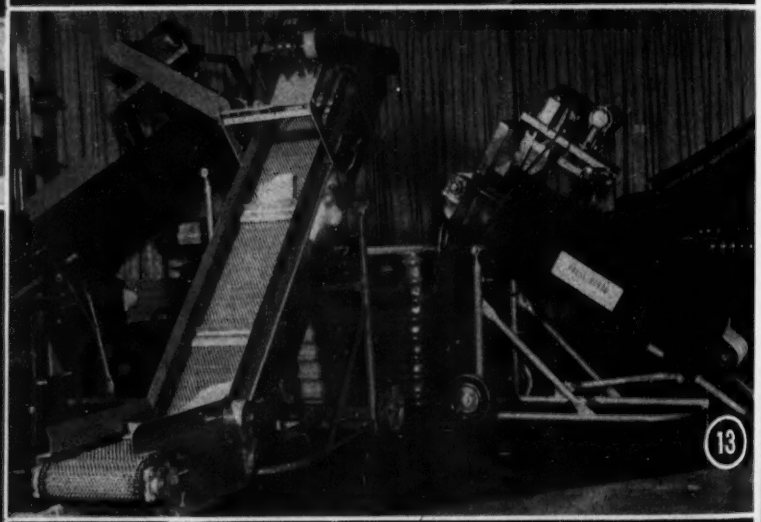
Fig. 11—Gravity wheel conveyor was designed by Speedways Conveyor Inc., Buffalo

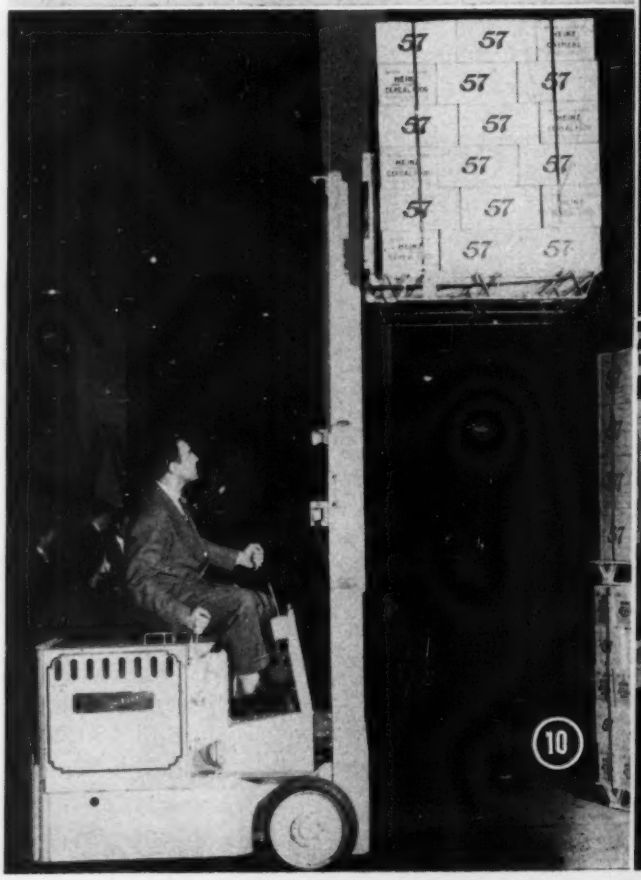
Fig. 12—Four 55-gallon drums are handled at once with this truck attachment

Fig. 13—New device for handling forgings directly from press

Fig. 14—Among newest devices revealed at the show by newcomer in the handling field, Bell Aircraft Corp., Buffalo, was this prime mover







Auto Engineers Swap Ideas

How wartime developments in vehicles, machines, tools, materials and methods are being applied to peacetime products told at Detroit convention of SAE

By GUY HUBBARD
Machine Tool Editor, STEEL

DETROIT

MORE than 3000 technical and production men of the automobile, aircraft, tractor, marine engine and various other fields related to the automotive industry were at the Book-Cadillac Hotel last week attending 26 sessions, 12 business meetings and 67 committee get-togethers involved in the 1948 annual convention of Society of Automotive Engineers.

This society, organized in 1905, now has more than 15,000 members. Its activities now encompass all engineering aspects of the design, development, production, use and maintenance of aircraft, aircraft power plants, air transport, diesel engines, fuels and lubricants, passenger cars, car and truck bodies, tractors, farm machinery, motor trucks and busses.

In the words of John A. C. Warner, general manager of SAE: "This 1948 affair is a feet-on-the-ground meeting, at which our members have gained valuable ideas from each other as to how to make most advantageous use of the vehicles, engines, planes, material and production machines, tools and methods which reflect accelerated wartime progress. Having created, we now have determined ways and means for advantageous utilization and application of the wonderful engineering assets which America now has."

What Public Wants—One way to direct such utilization and application would seem to be through determination of what the public desires. So reasoned E. R. Grace, vice president, Grant Advertising Inc. With this in mind, Mr. Grace launched an extensive survey, the results of which he presented at the SAE meeting under the title, "Do Americans Want a Small, Light Car?"

"With butter selling at 97 cents a pound, and bread at 18 cents a loaf," said Mr. Grace, "it is obvious that the now famous phrase 'guns or butter' can well be paraphrased as 'motor cars or butter,' with strong indications that today's high cost of living definitely is slowing up the prospective new car buyer.

"Regardless of age, sex or income group, 60.4 per cent of the American public believes that the leading motor car manufacturers should produce smaller, lighter cars at substantially lower prices than are now being charged. Almost three-fourths of the persons interviewed, or 72.7 per cent, said that if such a car were offered they would buy it in preference to the present so-called low priced cars. Of this group, 67 per cent said that they would buy such a car as their first and only automobile. Reason No. 1 was lower purchase cost, No. 2 was lower maintenance cost, and No. 3 was greater driving convenience."

R. J. PIGOTT

It is interesting to note that while the national average in favor of a smaller, lighter car (not a midget, however) was 60.4 per cent, the figure in Detroit soared to 83.8 per cent, in Atlanta to 87.7 per cent, in Topeka to 76.8 per cent, in New Orleans to 75 per cent, in Kansas City to 74.4 per cent and in Los Angeles to 64.6 per cent.

Automotive Steels—Among several speakers on metallurgical subjects was W. E. Jominy of Chrysler, who dealt with "present day approach to choice and application of automotive steels." Mr. Jominy said—"One thing is quite evident in comparing alloy steels used 25 years ago with those in use today in the automotive industry. We have been successful in using the steels which have the lowest first cost in the applications of our highest production parts. The steels most used 25 years ago were the SAE 6100 series, 3100 series, SAE 2300 series and SAE 3200 and 2500 series. Today our greatest usage seems to be in the SAE 5100, the 4000 series, the 1300 series, the 8600 series and the 4100 series. It is quite apparent that we have found it possible to use much cheaper alloy steels today than were used in our early experience."

An interesting commentary on the practical application of scientific metallurgical techniques was given by H. A. Tuttle and G. A. Nahstoll, Ford Motor Co., in their description of a mobile laboratory now used by that company. It is in the form of a panel delivery truck equipped with work bench, spectroscope, chemical spot test kits, apparatus for determining carbon by color, high speed grinder for spark testing, hardness testers and magnetic plating thickness indicator. An electric generator in the truck makes it possible to use the spectroscope outside the truck.

Competitors Co-operate—A typical instance of the friendly co-operation of competitors in an SAE project was given in the paper on "Current Practice in Tractor Transmission Gears," by W. H. Worthington and B. G. Rich, John Deere Waterloo Tractor Works. Twelve leading tractor and gear machinery and tool manufacturers pooled their information in this paper to the benefit of the entire industry.

At the annual dinner the new president of SAE for 1948-49 was introduced by C. E. Frudden of Allis-Chalmers, retiring president. The new president is R. J. Pigott, chief engineer, Gulf Research & Development Co., Pittsburgh, Pa.

B. B. Bachman, Autocar Co., was re-elected treasurer and John A. C. Warner was re-elected general manager. Among the 11 vice presidents is Joseph B. Armitage, vice president in charge of engineering, Kearney & Trecker Corp., Milwaukee, who will head up SAE production engineering activities for the current year.

Plastics Engineers To Meet Jan. 21-23

Feature of the three-day annual meeting of the Society of Plastics Engineers Inc. in Detroit, Jan. 21-23, will be a so-called national technical conference. Held at the Rackham Educational Memorial, the conference will comprise a group of about 40 participating companies in the industry which will reserve space in a central meeting hall where their representatives may sit down with engineers and others in the SPE membership, answer questions and exchange ideas. There will be no exhibit of materials and equipment.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

New export licensing policy gives indication of how mechanics of distribution are to be handled under European Recovery Program. Iron and steel items listed

CLUE as to how the government proposes to manage the mechanics of distribution under the pending Marshall Plan is seen in the new export licensing policy the Department of Commerce put into effect at the beginning of this month (STEEL, Jan. 12, p. 49).

The provision for competitive price bids, according to a statement by the department, is an effort to hold bloated domestic prices down and to preserve scarce dollar exchange. The argument, says the report, that companies with a traditional role in foreign trade are entitled to special consideration because of reconversion problems is now "anachronistic." In referring to the huge demands for goods anticipated once the Marshall Plan can be implemented, the report infers that "fiercely competitive conditions" must be resumed.

Limits Foreign Missions — In line with its policy of more competition in foreign trade, the department has limited foreign missions. At the latest count there were 126 such missions known to the Commercial Intelligence Division of the Commerce Department. Where a customary channel of importation is through a private importer, says the department's report, licenses naming private importers as consignees will be given preference, and licenses for shipment to foreign government distributive agencies will be considered only under the most exceptional circumstances. Where the importing government desires the Office of International Trade to approve export license applications naming an agency of the importing government as consignee, requests for this privilege will be considered by the OIT, provided such requests do not constitute an unwarranted departure from current established trade practices. Missions continuing limited activities must satisfy OIT as to the competitive nature of their procurement activities and dealings.

Importing governments will be invited to recommend for OIT approval those export license applications which will represent the least drain on their dollar resources. Such recommendations will be considered as a major factor in the approval of license applications. If the authorized representative of the importing government makes no recommendation, export license applications will be considered for approval by OIT on the basis of competitive export prices. For many commodities the end-use abroad will remain the principal criterion in licensing.

No Discriminations — There will be no attempt to discriminate against any nation or nations, say OIT spokesmen, under the modified policy. Reduction of shipments to Russia and her satellites may occur as a result of the bulk of goods going to Marshall Plan countries, it is pointed out, but all the countries in the Russian sphere of influence were originally invited to join the Marshall Plan.

The following iron and steel products are included under the new licensing policy:

Pig iron.

Iron and steel scrap: No. 1 heavy melting, No. 2 melting, hydraulically compressed and baled sheet scrap, cast and bundled iron scrap, heavy shoveling steel, selected rail scrap, machine shop turnings, wire shorts, etc.

Tin plate circles, strips, cobbles and scroll-shear butts.

Waste tin plate.

Steel sheet bars and tin plate bars containing no alloy.

Steel bars, cold finished, nonalloy, 1 in. and under.

Concrete reinforcement bars.

Other steel bars (hot-rolled) containing no alloy, 1 in. and under, except tool steel and specialty steel.

Wire rods except specialty steel.

Boiler plate.

Other plates, except fabricated (hot-rolled and cold-rolled included) containing no alloy.

Iron sheets, galvanized.

Steel sheets, galvanized.

Steel sheets, black, ungalvanized (hot and cold-rolled included) containing no alloy; with less than .40 per cent carbon content, except strapping.

Iron and steel strip, hot-rolled, containing no alloy, with less than .40 per cent carbon content.

Tin plate and taggers' tin.

Terne plate, including long ternes.

Casing and oil line pipe: Seamless, welded.

Seamless black pipe, except casing, oil line and boiler.

Malleable iron screwed pipe fittings, 150-lb pressure and under.

Cast iron pressure pipe.

Cast iron pressure pipe fittings.

Welded black pipe, steel.

Welded black pipe, wrought iron.

Welded galvanized pipe, steel.

Welded galvanized pipe, wrought iron.

Floor drains, cast iron; and the following iron and steel pipe fittings, when 150 lb pressure and under: Couplings; galvanized pipe fittings; malleable iron pipe fittings; pipe joints, grey iron, extension; pipe nipples, lap-welded, black; pipe plugs; pipe unions; screw elbows; swage nipples.

Iron and steel wire, uncoated (plain, stainless and alloy steel included).

Bale ties, wire, iron and steel.

Wire nails.

Nails: Asbestos shingle; cut; roofing, lead-headed; shingle, siding, zinc-coated; smooth, flat head, cement coated.

Steel ingots, blooms, billets, slabs (Armco iron, ingot iron and other iron made in steel-making furnaces included): Containing no alloy (steel ingots, billets, blooms and slabs); alloy and stainless steel (ingots, billets, blooms and slabs).

Iron and steel bars and rods: Steel bars, cold-finished (non-alloy), stainless, all sizes, and other than stainless, over 1 in.

Other steel bars and rods (hot-rolled); containing no alloy, tool steel and specialty steel, all sizes and other than tool and specialty steel, over 1 in.; alloy steel, except stainless.

Iron and steel plates, sheets, skelp and strips: Other plates, except fabricated (hot and cold-rolled included); alloy steel, except stainless.

Skelp iron and steel.

Steel sheets, black ungalvanized (hot and cold-rolled included): Containing no alloy, with .40 per cent or more carbon content; alloy steel except stainless.

Strip, hoop, band and scroll iron and steel: Cold-rolled, containing no alloy; iron and steel strapping; iron and steel strip, other than strapping, with .40 per cent or more carbon content; iron and steel hoop, band and scroll; hot-rolled, containing no alloy, including: Iron and steel strip with .40 per cent or more carbon content and iron and steel hoop, band and scroll.

Structural iron and steel: Water, oil, gas and other unlined storage tanks, complete with knock-down material, for temporary or permanent installation, n.e.s.; all structural shapes except fabricated bulb angles, angles other than bulb angles, channels and beams, over 6 in.; plates, fabricated, punched or shaped; sheet piling.

Railway track material, iron and steel: Rails, including 60 lb and over per yard, under 60 lb per yard and relaying pins.

Tubular products and fittings, iron and steel: Welded and seamless boiler tubes; iron and steel pipe, n.e.s.

Wire and manufacturers: Galvanized wire; barbed wire; baling wire, black, annealed; coils, cold-finished; musical instrument wire; piano wire, spring wire, bright steel for musical instruments.

Iron and steel forgings, n.e.s. (except railway car wheels, tires, axles, horseshoes and mule shoes): Containing no alloy and alloy steel (stainless included).

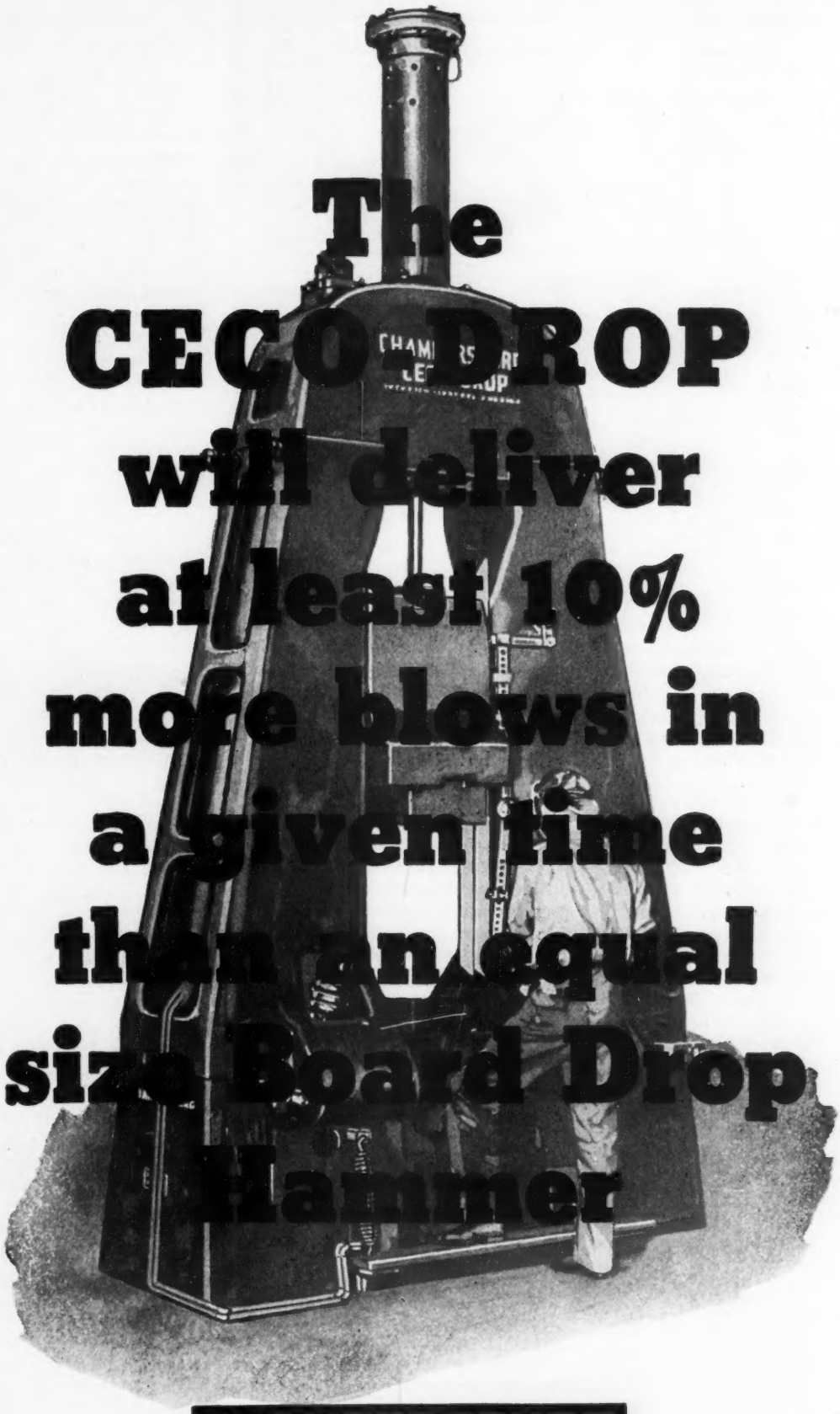
Navy Studies Aircraft Engines

Research in airplane propulsion, much of which is carried on by industry, has been complicated during the past few years by the fact that investigations must be conducted simultaneously in many directions, according to Capt. John L. Ewing, Navy Bureau of Aeronautics, who summarized the bureau's program at a recent meeting of the Navy Industrial Association.

Chief complicating factor, explained Capt. Ewing, is that there is no longer one basic type of engine, but seven: The reciprocating engine, the compound reciprocating engine, the turbo-propeller, the turbo-jet, the ram-jet, the pulse-jet and the rocket. Bulk of the bureau's budget is currently going into study of turbo-propellor and turbo-jet engines. The bureau's limited funds have precluded any extensive work with reciprocating and compound reciprocating engines.

Concentrates Research — Developments are being pursued, Capt. Ewing said, on two major types of gas turbine engines, the axial flow compressor and centrifugal flow com-

The CECO DROP will deliver at least 10% more blows in a given time than an equal size Board Drop Hammer



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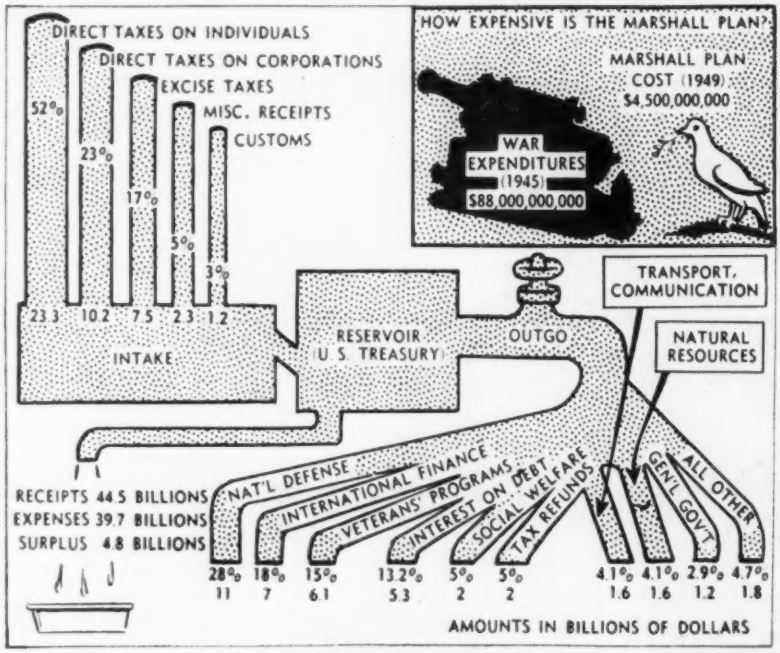


TRUMAN'S BUDGET: The President's budget for the fiscal year 1949, beginning July 1, 1948, estimates major receipts and expenditures as diagrammed above. Operating like a water system, money flows in from the sources at top left, through the Treasury, and out into the major expense channels, at right below. Figures are given in billions of dollars, together with percentages of total. Small chart, upper right, shows how Marshall Plan cost measures up to costs of war. NEA photo

pressor engine. Of these two, the axial type is getting more attention now because it has greater efficiency, lower weight, small frontal area, and potentially more capacity.

In regard to power plants for pilotless aircraft and guided missiles, ram-jets, pulse-jets and rockets are using a considerable portion of the bureau's budget. In this class, the captain continued, ram-jets appear to be the most promising because they are applicable to guided missiles of supersonic speed and may eventually be suitable for piloted aircraft. Liquid rocket engines are also under study. They may be used in vehicles which are to travel outside the influence of the earth's atmosphere.

Summarizes Trend in Accessories— The trend in Navy propellor development, Capt. Ewing explained, is to cover the higher horsepower available with moderate diameters (13 to 17 feet) and very wide blades. Starting systems for aviation engines of the turbo-jet and turbo-prop class will be in a much higher horsepower class than for reciprocating engines, research indicates. Development is in progress to furnish starters deriving their motive energy from gases.

Research in power plant control has been towards simplification. This has been accomplished in single reciprocating engine planes by incorporating a single-lever, throttle and supercharger control. The problem is more difficult with the turbine family of engines. A search is currently being pursued to develop a durable device to sense temperature quickly and accurately at the turbine inlet.

Fuels Standardized — Jet engines have been adapted to use the same high octane gasoline as reciprocating engines. This arrangement is necessitated, the captain explained, in order to avoid complicating supply conditions with two types of fuel. With the gradual elimination of reciprocating engines, the Navy will turn to the A-N standard jet fuel.

New Product Opportunity

A presently minor branch of the metalworking industry appears due for expansion when sheets and castings become more plentiful. This is the industry that manufactures apparatus for drying crops.

All through the ages moisture has caused spoilage of crops and only in recent years has something been done about it. It was not until last year, however, that a really determined effort was made. Disturbed by the impending failure of a large part of the 1947 corn crop, and having in mind the shortage of food generally, the Department of Agriculture undertook to buttress its grain conservation program by the development of more efficient corn dryers.

The Department of Agriculture assigned the job of developing a satisfactory grain dryer to one of its best engineers, W. V. Hukill, at the Iowa Agricultural Experiment Station, Ames, Iowa. Mr. Hukill came up with blueprints for six different experimental dryers and these were placed under contract with four fabricators. They were available in time for experimental use in November and December, and Mr. Hukill gave a preliminary report of their performance at a meeting of agricultural engineers in Chicago in the latter month. The gist of his remarks was: The experimental dryers are not all that had been hoped, but experience with them points the way to improvements which should result, ultimately, in efficient units for drying grain and other crops sufficiently to protect them against spoilage in storage. Mr. Hukill has some clear-cut ideas as to how present designs may be improved.

Companies that built the Department of Agriculture's six experimental dryers are the American Crop Drier Corp., Crystal Lake, Ill.; Habco Mfg. Co., Columbus, Nebr.; Campbell Dryer Co., Des Moines, Iowa; and the Dominion Engineering Co., Arlington, Va. The units were of various sizes—for drying the contents of cribs containing from 900 to 2500 bushels of corn. They were designed to use such fuels as oil, bottled gas and coal, and to heat the drying air to approximately 70 degrees above the temperature of the atmosphere. All units are portable to permit moving them from one farm to another.

Other companies on the department's list of corn dryer manufacturers include the Beklen Mfg. Co., Columbus, Nebr.; Hess Warming & Ventilating Co., Chicago; Lanz-Mandt Drier Mfg. Co., Madison, Wis.; Herman Nelson Corp., Moline, Ill.; O. W. Randolph Co., Toledo, O.; T. Rescheko Machine Works, Wichita, Kans.; Sears, Roebuck & Co., Chicago; Pierson-Moore Co., Lexington, Ky.; Sioux Motor Cleaner Mfg. Co., Sioux Falls, S. D.; Cavalier Engineering Products Co., Chicago; Despatch Oven Co., Minneapolis; Diamond Iron Works and Mohr Mfg. Co., North Minneapolis, Minn.

Design of corn cribs also figured importantly in the program. Manufacturers desiring information about best corn crib practice can get it from Leo Holman, engineer, Illinois Agricultural Experiment Station, Urbana, Ill.

French Fight Strike's Effects

Heavy taxes levied as anti-inflationary measure. Tonnage losses in iron and steel great. Workers repudiate communist-led CGT to form new union

DISASTROUS effects of the recent French labor turmoil are strongly evidenced by the sharp decline in production of iron and steel in November. Overall output loss was estimated at between 15 and 30 per cent. Pig iron production was reduced from 466,000 metric tons in October to 390,000 tons in November. Tonnage of steel ingots and castings produced declined from 559,000 to 413,000 in November. Only 300,000 tons of steel were rolled in November compared with 407,000 tons in the preceding month.

Settlement of the wide-spread strikes came several days after Premier Robert Schuman's cabinet ordered workers back to their jobs. In accepting the government's ultimatum, the communist-directed General Confederation of Labor (CGT) attacked the government "which stopped at no methods and ordered the police to fire on strikers" but finally complied completely with the government's wage terms.

Although both the CGT and the government made concessions in the strike settlement, the CGT was rebuffed in two main points: The government granted a $12.50 living cost bonus, instead of $20.80 which had been demanded; and instead of a review of the wage problem every three months as had been asked, the government established a salary and cost of living index which would be fixed until June 1.

Taxes Increased — In its fight against inflation, the government then prepared a series of measures involving a super tax on all incomes in excess of $6250 a year and on business and farm profits. This plan heavily taxes all high incomes but provides a loophole by exempting taxpayers who contribute to a new reconstruction loan. The plan also puts additional taxes on gasoline, alcohol, precious metals and other luxury products.

As another means of cutting prices and discouraging black market activities, the government is considering importation of large quantities of lard, butter, cheese, flour and wheat. This action, it is hoped, would lower prices through increased competition. French farmers who would be affected would be reimbursed by grants of needed raw materials.

As a result of the strikes, which for the most part stemmed from political rather than economic reasons and which for this reason were largely participated in by workers under duress, a substantial section of the membership of the CGT left that organization and, under the leadership of Leon Jouhaux, formed a new, nonpolitical trade union known as the Workers' Strength. Independent union leaders have not yet decided whether to join this new organization, which is not as strong as the CGT, or to remain unaffiliated.

Belgium, Luxemburg

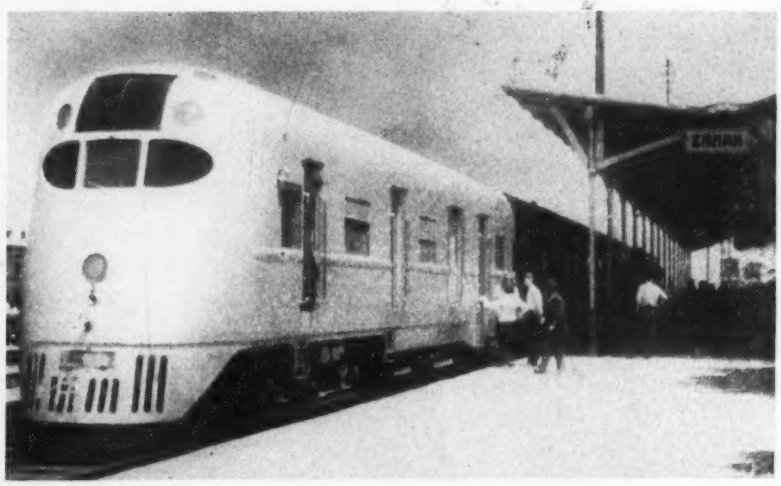
Exports of iron and steel from the Belgo-Luxemburg economic union set a postwar record in October at 235,800 metric tons, bringing the ten-month total to 1,871,500 tons, compared with 1,543,300 tons in the corresponding period of 1946. Most active markets were the Netherlands, Sweden, Switzerland and Argentina. Export demand, although more spotty than it had been, is still greater than can be supplied and prices in free markets are high. Structurals have been quoted at $134 per ton, delivered Near East, wire rods at $136 and merchant bars $139. Inquiries have been received recently from Argentina for black and galvanized sheets, hoops, barbed wire, tubes and pipe. Some orders have been booked for wire products and for nuts and bolts, but a large part of the inquiries for sheets have had to be rejected because of the continuing shortage.

Italy

A $50 million contract has reportedly been drawn up between the United States and Italy under which Italy would receive American billets to be rolled by Italian mills into steel tubes for Argentina. An improved supply of electric power has made possible gains in output of steel. Plans for first quarter, 1948, call for output of 350,000 tons of steel, with 120,000 tons to be rolled into plates and sheets, 50,000 tons for tubes and from 12,000 to 15,000 tons for rails.

Scandinavia

A new rolling mill is to be built at the Frederiksvaert, Denmark, which will double the present output of ship plates. Norway has reportedly been promised a supply of steel plates for shipbuilding from the United States in return for Norwegian pig iron. Swedish exports of iron ore in the first ten months of 1947 totalled 6,900,000 tons, compared with 4,400,000 tons in the corresponding period of 1946. During the same period imports of pig iron were 114,600 tons, compared with 76,700 tons in the corresponding 1946 months. Imports of rolled products in the first ten months of 1947 were 554,000 tons against 395,800 tons in the like 1946 period. Output of pig iron through October totalled 572,900 tons compared with 555,900 tons in the like 1946 period, and output of steel ingots declined slightly from 695,400 tons in the ten months of 1946 to 682,800 tons in the same 1947 period.



RUSSIAN DIESEL: A modern diesel passenger train, designed for operation in the Caucasus mountains, stops at a way station between Baku and Tbilisi. NEA photo

Pipe Supply To Continue Short

New peacetime production record established in 1947 with 6 million tons, but output is far below demand. Repairs, steel scarcity to limit production during this year

OUTLOOK for improvement in 1948 in the pipe supply, particularly line and standard merchant items, is not encouraging.

Although the industry established a new peacetime record last year of around 6 million net tons despite a limited supply of billets, skelp, tube rounds and strip, and although additional new pipe production facilities are scheduled to come into operation in 1948 it is not likely adequate semi-finished will be available to boost output much above that mark. A further limit to output is the necessity for making repairs that have been postponed so that interruptions to production could be avoided as long as possible.

Output High in 1947—The industry's accomplishments in 1947 stand out prominently, as is indicated in the following table of total pipe and tubing output (net tons) in recent years, according to the American Iron & Steel Institute:

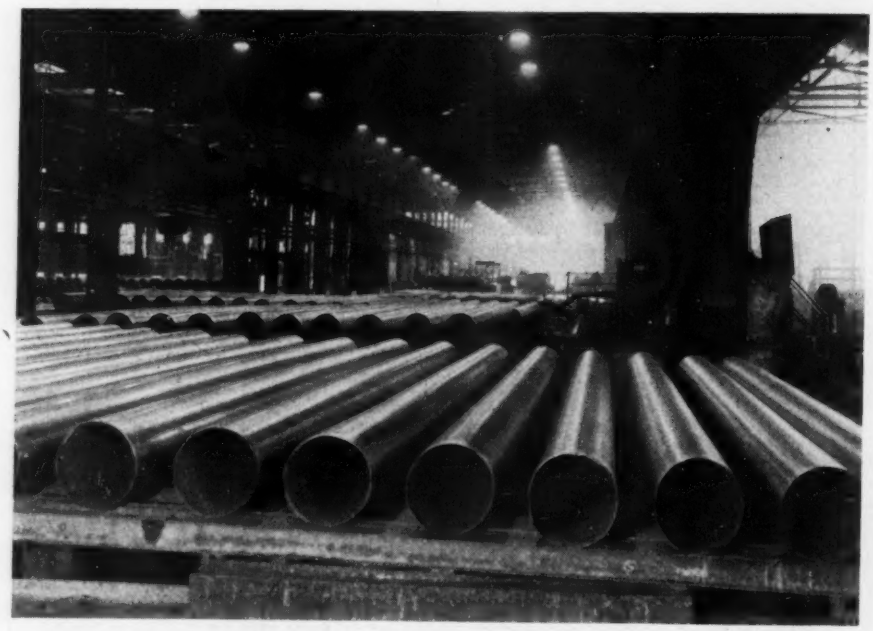
1947	6,000,000*	1938	2,580,463
1946	4,689,932	1937	4,282,584
1945	6,030,243	1936	3,643,779
1944	6,406,423	1935	2,276,544
1943	6,219,345	1934	2,045,887
1942	5,283,844	1933	1,588,353
1941	5,736,906	1932	1,107,542
1940	4,272,684	1931	2,059,421
1939	3,764,272		

* Estimated.

The 1947 production by product classification on the basis of historical pattern is estimated as follows (in net tons): Standard pipe, 2,436,000; oil country goods, 1,812,000; line pipe, 1,020,000; tubing specialties (mechanical and pressure), 582,000; all other, 150,000.

Line Pipe Demand Heavy—No immediate easing in pressure for delivery of line pipe is seen. Some producers are booked into 1952 for large diameter line pipe, a condition not particularly surprising when it is considered there was very little pipe line construction during the war and that when the war was over the nation swung heavily to oil and gas for fuel. It is estimated about a million tons of steel will be required annually for the next four years for pipe lines 20 in. o.d. and larger, or 20 times the volume of this size pipe purchased for trunk lines in the five-year prewar period. More than 28,000 miles of oil and gas pipe lines for installation during the period 1947 through 1951 are estimated to have been ordered or projected.

Standard pipe requirements for miscellaneous plant repairs, new construction and other uses, including the augmented railroad car program, continue abnormally large, with a result jobbers' inventories are about depleted despite relatively large monthly mill shipments through 1947. One producer estimates it would take about three months at the present rate of standard pipe production to rebuild mill and jobbers' stocks to prewar ratio commensurate with present output, even if not a single foot of pipe were shipped to any consumer. It is estimated about one-half of the standard pipe output last year was shipped to jobbers' stock account.



Seamless pipe is shown on cooling beds at the No. 3 seamless mill at National Tube Co.'s Lorain, O., works

Oil Country Demand Strong—Contributing to the heavy demand on the pipe and tubing industry is the expanded activity in the oil fields. Whereas an average of 23,693 new wells were drilled a year in the four-year war period, 1942-1945, there were an estimated 33,000 new wells in 1947, a 39 per cent increase. Furthermore, average depth of wells drilled in 1947 was about 10 per cent greater than in 1942.

Extent of the increase in oil field activity is brought out in the following table compiled by the *Oil and Gas Journal:*

	Total No. of New Wells	Total Footage of New Wells (000)	Average Depth Per New Well (feet)
1947	33,000*	112,000*	3,400*
1946	30,333	101,026	3,331
1945	26,649	92,982	3,489
1944	25,786	84,378	3,272
1943	20,349	61,992	3,046
1942	21,990	67,903	3,088
1941	32,510	99,348	3,056
1940	31,149	96,183	3,088
1939	28,012	85,523	3,053
1938	29,127	90,585	3,110
1937	35,045	104,733	2,989
1931	12,233	35,769	2,924
1929	26,069	75,600	2,900

* Estimated.

Nearer to Balance—While supply of most oil country goods does not equal present demand, it is nearer in balance than line pipe and refinery tubular goods. The large tonnage required in oil country goods has been accentuated by the nature of the demand. Casing of 80,000 lb minimum yield, which for a leading producer was 7 per cent of the total casing tonnage produced in 1942, increased to more than 25 per cent in 1947.

Total production (in net tons) of oil country tubular goods in recent years has been as follows, according to the American Iron & Steel Institute:

1947	1,500,000†	1938	1,034,921
1946	1,094,962	1937	1,418,579*
1945	1,117,793	1936	1,115,620
1944	1,126,705	1935	744,076
1943	674,570#	1934	680,804
1942	457,603#	1933	366,157
1941	1,050,643	1932	304,157
1940	1,028,410	1931	165,928
1939	1,050,083		

† Estimated.

Production restricted by government directive until all mill, field and customer stocks of oil country goods were depleted.

* Includes 170,000 tons of lap-weld oil country goods.

Some Declines Noted—There are a few exceptions where demand for

tubular products is declining, amounting, however, to only a small percentage of total output. High-alloy tubing has become readily available, and production of cold-formed mechanical tubing, and to a lesser extent, drill pipe also is in closer balance with demand.

Analysis of production figures for a representative group of seamless steel tubing specialty mills reveals that the 1947 dollar valuation of shipments was off from the war peak, but remained about twice the prewar 1938-39 level. However, it must be kept in mind that specialty tubing prices have risen from 17 to 30 per cent since the prewar period, and because of scarcity of carbon tube rounds, output of higher priced alloy tubing represented a larger proportion of total production in 1947 than in 1938 and 1939.

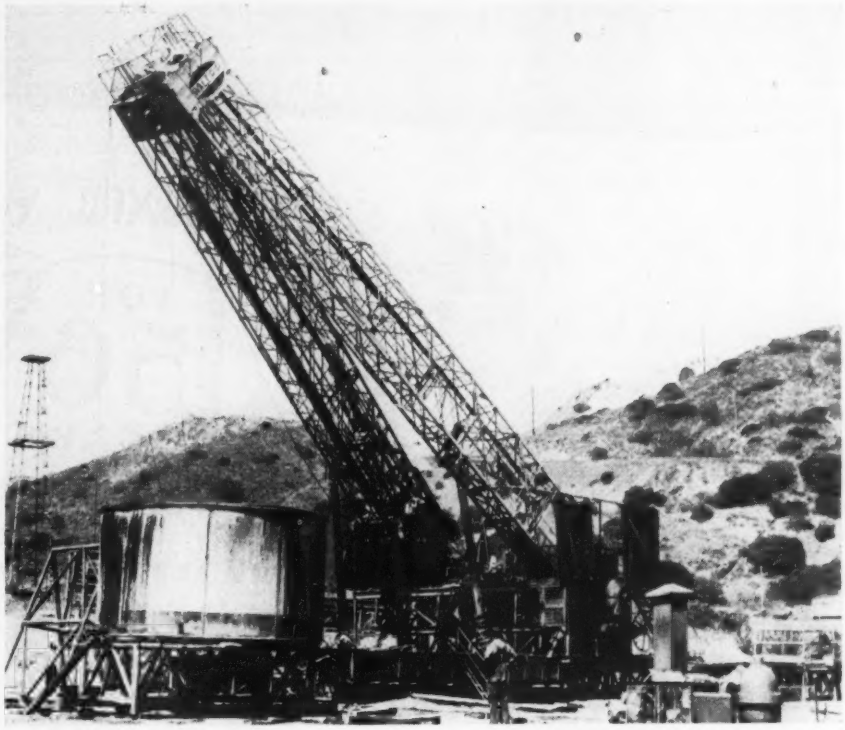
Lack Semifinished, Strip—Major reason for the drop of seamless and electric welded tubing last year below the war peak levels was scarcity of semifinished and cold-rolled strip.

In relating production statistics to the pipe and tubing industry's reported capacity, it must be remembered there has always been surplus finishing mill capacity due to the flexibility required for various types of product mix in different periods. Some capacity includes marginal equipment involving high cost, obsolete and worn-out equipment. However, the following figures give an indication of the industry's pipe and tubing capacity, as reported by the American Iron & Steel Institute: 8.3 million tons in 1944; 8 million in April, 1945; and 7.7 million on Jan. 1, 1947. In 1944, the percentage of production to capacity of finishing units for the pipe and tubing industry was 73.2 per cent; in 1945, 72.5; in 1946, 61.3 per cent; while for 1947 it was estimated at about 78 per cent.

Reflects Obsolescence—Decrease in the industry's capacity is due to obsolescence and dismantling of worn-out, high-cost production units, primarily for production of lap-weld pipe. Three major producers have discontinued production of lap-weld pipe and a fourth plans to in the near future, while other interests' production schedules are limited as to range of sizes produced and are below capacity due to shortage of semifinished steel and cost factors.

In an effort to meet urgent line pipe requirements, some oil companies have entered the market for ingots, semifinished steel and plates for conversion eventually into pipe at prices usually well above official market quotations. However, this type of tonnage is relatively small.

To help expedite matters, tubing manufacturers have been drawn into the production picture. In some instances these interests are melting carbon steel in electric furnaces and rolling up to 8⅝ in. boiler tubes to pipe dimensions and charging boiler tube prices. Some interests are producing carbon line pipe with 0.5 per cent molybdenum, NE-8640 alloy casing blanks and nickel steel alloy tubing; also small diameter standard merchant line pipe at tubing prices.



New 18-ton portable oil derrick, shown here being erected on an oil drilling site of Shell Oil Co. Inc., is expected by the oil industry to help check mounting drilling cost, through the economies of its mobility. In operation, the twin mast derrick will reach a height of 123 ft. NEA photo

May Substitute Aluminum—Current critical shortage of line pipe has given impetus to experimental work and field tests under way aiming at possible substitution of aluminum for steel. It is said that aluminum's resistance to crude petroleum is satisfactory and that welded aluminum pipe will stand the necessary pressures. Seamless aluminum tubing has been made up to 12 in. o.d.; welded rolled aluminum plate is used for over 12-in. pipe, and further study is under way as to possibility of going up to 30 in. o.d. Industry sources state cost of aluminum pipe normally is prohibitive, but because of the critical shortage of steel pipe today it would afford a much needed substitute if satisfactory in operation.

Present high construction costs and narrow profit margins for pipe and tubing items are not conducive to launching of large-scale expansion programs within the industry. Additional pipe mill capacity requires large capital investment, and, to be utilized under present circumstances, probably would necessitate additional steelmaking facilities. Such facilities ordinarily could be justified only by a sustained, strong demand over a long period, and would require about two or more years for completion, trade authorities contend.

For Trunk Line Pipe—Most of the additional capacity that has been built or announced is for production of trunk pipe lines. One company on the West Coast has installed equipment for fabrication of large-diameter pipe from plate, and another similar mill has been announced for the Birmingham area. Significantly, these mills are dependent on new steelmaking facilities built during the war, so production from these units should represent a net addition to pipe production. Many of the expansion programs have been retarded by numerous obstacles, including extended deliveries for electrical equipment.

Pipe and tubing producers carefully restricted exports in 1947 to the same percentage of total output that existed in the prewar period. Leading producers state they exported less than 7 per cent of their 1947 pipe and tubing output. Government export statistics on pipe indicate a higher percentage of total output but these data include shipments from other than pipe producers.

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HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Ferguson suit against Ford Motor Co., seeking $251 million in damages, given little chance of success. Ford terms former associate's charges "ridiculous"

DETROIT

WHILE it has the distinction of being one of the largest civil suits on record, the action brought by Harry Ferguson in New York federal court against the Ford Motor Co., seeking $251 million damages for "unlawfully seizing and using Ferguson inventions, engineering ideas, and violating the agreement of trust and confidence made in 1939 by Ferguson and the late Henry Ford," is given little chance of success in informed Detroit circles. The move was long expected from Ferguson whose connection with the company was terminated in November, 1946, by the new management at Ford, after some 19 years of association. The strange part is that in all this time there were no written agreements between Ford and Ferguson, and the latter's case seems to hinge entirely on the court's interpretation of the "agreement of trust and confidence."

The Ferguson tractor and implement system did not go into production at Ford until 1939 and in the ensuing seven years the company claims Ferguson was made a multimillionaire while the company dished out $25 million in the process. When the venture was terminated over a year ago, Ferguson was given six months continuance so that he might make other arrangements. He proceeded to draw up plans for issuing $7.7 million in common and preferred stock, and took an option on the former Cleveland Pneumatic Aerol war plant as a production site. However, the securities market turned sour last spring, and most dealers handling distribution of the tractor switched over to the new Dearborn Motors Inc., organized by Ford to succeed the Ferguson setup.

At about this time, Ferguson's president, Roger M. Kyes, resigned and Ferguson himself left for England to supervise arrangements for building his tractor and implements there for export to South America and elsewhere. He returned to this country long enough to boast he would win his civil action against Ford if it takes "every dollar I have."

Sales Exceeded $312 Million—Gross sales of tractors and implements during Ferguson's eight-year tenure are stated to be in excess of $312 million. Last year alone nearly 86,000 tractors were built by the company. Implements are manufactured by outside companies, although they are distributed by the central organization.

Dearborn Motors has been regarded around Detroit as a sort of incentive farm for a number of top Ford executives, the reasoning being that they might receive appreciable capital gains as directors of the tractor subsidiary which would not be taxable to the extent of the salaries they received from Ford. E. R. Breech, J. R. Davis and A. J. Browning of Ford all are directors of Dearborn Motors, along with others close to the new Ford official family, such as Frank R. Pierce, Dearborn Motors president, E. C. Kanzler, Thomas A. Farrell and Grant Cook. Ferguson names all these individuals in his suit, and charges one purpose of the "conspiracy to drive the Ferguson company out of business" was to give Ford executives capital gains on Dearborn stock. Ford, however, always has maintained none of its officials are stockholders in Dearborn Motors, so just how they could participate in capital gains is vague.

Calls Charges "Ridiculous"—Henry Ford II, commenting on the suit, says any suggestion of conspiracy or unfair competition is simply ridiculous, and adds that the arrangement with Ferguson was terminable at will by either party. He declares Ferguson's complaint is full of untruths, omitting many important facts and twisting and distorting others out of their true meaning. Ford will be "happy to meet all of the allegations in the complaint at the proper time and place." A field day for legal talent of both sides appears imminent.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947	1946
January	366,205	109,910
February	393,636	101,637
March	443,588	134,071
April	445,137	229,867
May	404,191	263,445
June	421,466	217,943
July	400,944	315,963
August	364,478	358,457
September	444,501	339,774
October	461,536	406,561
November	418,368	389,645
December	483,639*	393,223
12 mos.	5,047,689*	3,260,496

* Preliminary.

Estimates for week ended:

Dec. 27	75,638	67,070
	1948	1947
Jan. 3	65,573	53,437
Jan. 10	112,219	64,828
Jan. 17	110,000	75,166

Estimates by Ward's Automotive Reports

Ford Names New Executives

Two more top-rank additions to the Ford administrative staff have been made. One is Graeme K. Howard, formerly vice president in charge of General Motors overseas operations, who has been named consultant to survey Ford's International Division and its foreign subsidiaries, and will leave soon to visit operations in Europe. He has served with GM since 1920 and spent considerable time both in Europe and the Far East. After service in World War II, he returned to GM and retired last summer.

The second recent appointment is Robert G. Copeland, for many years a prominent figure in automotive advertising in Detroit, who has been named director of Lincoln-Mercury advertising.

New Trucks Introduced

Last week the first postwar product to emanate from the Rouge Plant —a new line of trucks—was announced to the trade, somewhat anticlimactically since magazine advertisements had appeared previously. The truck series, distinguished by the recessed radiator grille and headlights, includes two of the largest models ever built by Ford, with gross vehicle weights of 19,000 and 21,500 pounds, respectively, and a new 6-cylinder cab-over-engine model. Three new power plants now are available for trucks — a 95-horsepower 6-cylinder, a 100-horsepower V-8 and a 145-horsepower V-8.

The new trucks are described as "bonus-built," a phrase coined by advertising specialists no doubt in the effort to come up with something as

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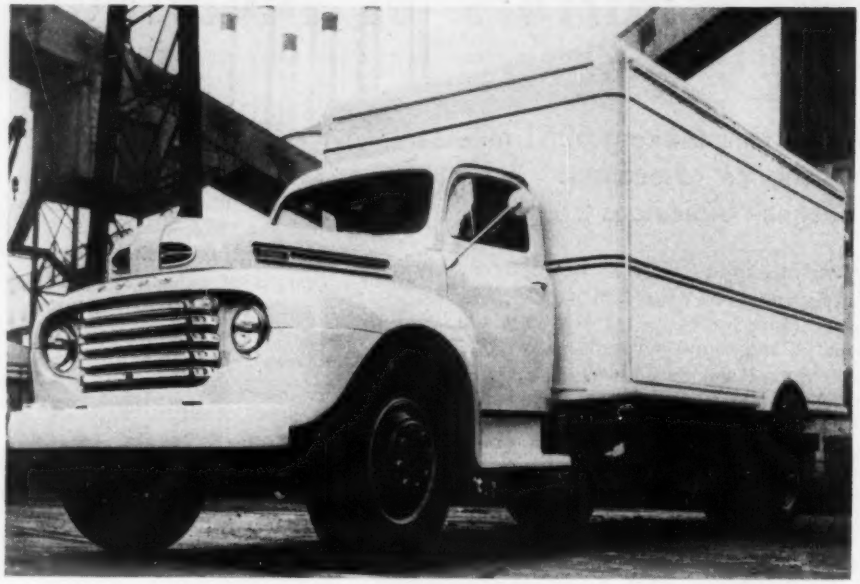


New 1948 3-ton truck with 195-in. wheelbase is the largest such vehicle ever built by Ford. The restyled line offers a wider range of models and capacities than ever before. They are powered by three new engines—a 95-hp, 6-cylinder unit, a 100-hp V-8 and a 145-hp V-8

effective as the term "job-rated" which is applied to Dodge trucks. They feature greater front-end strength through improved sheet-metal suspension and heavier construction. Fenders are heavier, wider and of a new design which provides greater tire clearance. Front bumper is of heavy channel section attached directly to extended frame siderails. Cabs provide up to 7 inches greater width and more head-room. Weather-proofing has been improved and hardware is heavier.

A novel gadget now is available for Ford engines in the form of a magnetic drain plug, containing a strong permanent magnet anchored in the body and extending into the engine crankcase. It is designed to pick up any iron or steel particles which may accumulate in the oil, thus preventing wear on moving parts. The plug also is available for transmission and differential drains.

Buick Announces 1948 Models

High spots of the Buick 1948 model announcement, released over the week-end were the Dynaflow automatic transmission and a new type of controlled-frequency engine mounting system. The latter is a three-point suspension system, with two mounts at the front, one on each side at about the center of the engine, and one to the rear at the torque tube ball joint. The mounting elements themselves are steel stampings to which is bonded a vibration-dampening layer of GR-S synthetic rubber which tests have proved to have high hysteresis value to provide unique damping properties. They serve to absorb pitch, roll and yaw tendencies of the engine and contribute importantly to a smooth ride.

The Dynaflow transmission, to be available optionally on the largest of the three series of Buick models only, has been under development for the past three years and combines the characteristics of the torque converter and those of the fluid coupling to yield the effect of an infinitely-variable ratio transmission. The unit has only half the parts of the General Motors Hydra-matic drive—a step-type transmission incidentally—and adds only 35 pounds to the weight of the car. Essentially it comprises the converter-coupling element which delivers power through a planetary gear unit to the rear wheels.

The coupling comprises five rotating elements—a primary pump, turbine, primary and secondary stators and a secondary pump. The stators and secondary pump are arranged with over-riding clutches so that they will free-wheel under certain power conditions, giving a direct drive through a fluid coupling at high speeds. The stators and secondary pump act to develop a torque multiplication of 2.4 to 1 in starting up.

These elements are of aluminum, cast in plaster molds by the Antioch process at the Allison Division plant and represent a remarkable achievement in the precision casting of production parts. The radial vanes in them are staggered in quadrants around the shell, and vary in thickness from the outside to the root, something which could not be achieved readily in a stamped and brazed assembly. Clearance between the rotating elements is only about 1/16 in. The transmission is filled with 11 quarts of oil, about 10W viscosity, which serves to operate the torque converter and also the various hydraulic controls actuating a clutch and brake band unit just ahead of the planetary gear train. The latter is employed to give an emergency low ratio for heavy pulling, and for reverse. Behind the planetary unit is gear and pawl arrangement, actuated mechanically, to lock the mechanism when the car is parked.

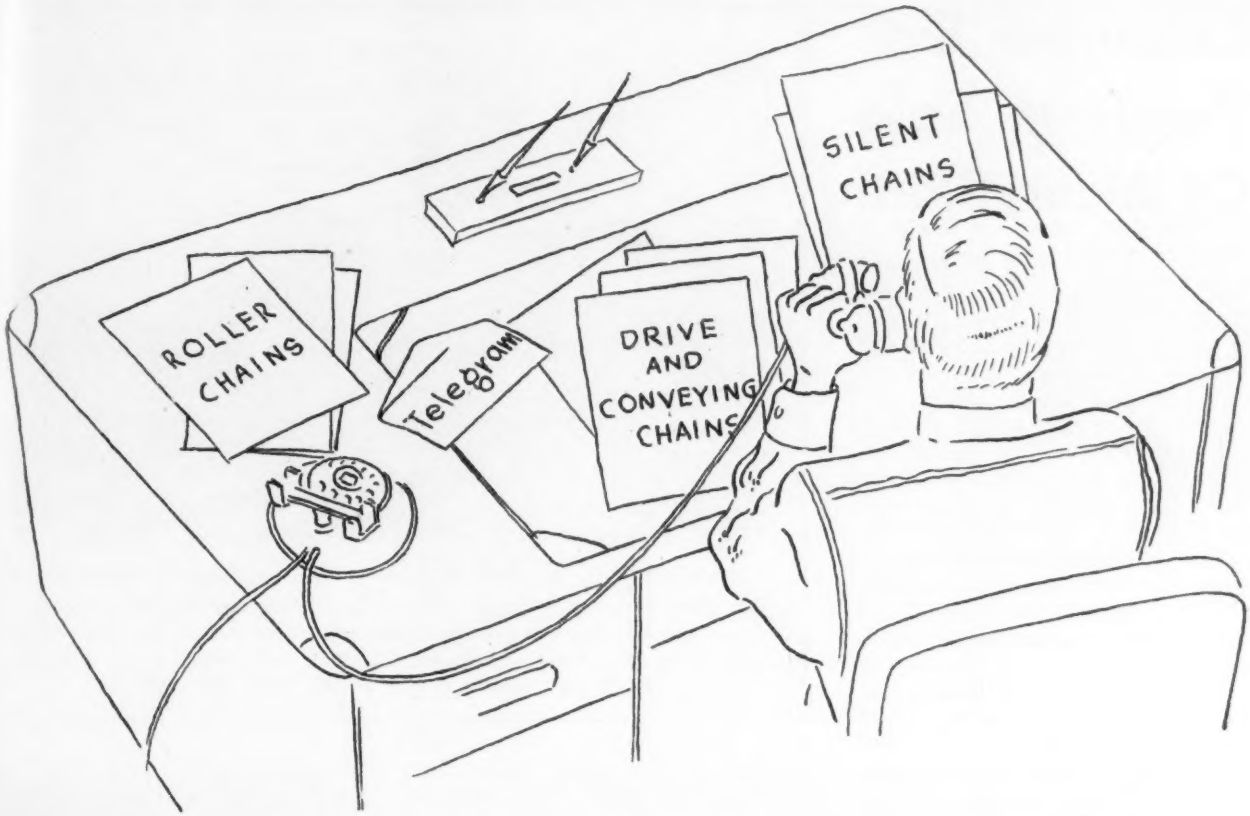
Control lever on the steering column has five positions — parking, neutral, low, driving and reverse. It may be shifted at will into any of these positions, except that a slight lift is necessary to move into reverse or parking positions. An interlock on the ignition switch prevents starting the engine except when the control lever is in either parking or neutral positions. The transmission permits using the braking effect of the engine down to about 40 mph in the normal driving range, and down to 30 mph in emergency low. The engine also may be started by pushing the car if speed is brought up to about 30 mph.

With the automatic transmission, of course, no clutch pedal is needed, instead the brake pedal has been widened and located more centrally so that it may be operated with either foot.

Buick engineers believe that since the transmission has considerably fewer parts than the Hydra-matic drive it can be built at less cost under comparable volume. It will take time to establish the true cost picture, as well as the public's reaction to the device. If the enthusiasm of company officials and technical experts is any measure, the Dynaflow will mark a new era in transmissions.

GM To Sell Bendix Interest

After holding a minority stock interest, now down to 399,990 shares of common, in Bendix Aviation Corp. continuously since 1929 and after giving detailed consideration to acquiring the company as a division or wholly-owned subsidiary, General Motors has decided to abandon the plan and dispose of its interest. Bendix Aviation for many years has sold various products in substantial quantities to GM Divisions, commercial relationships which will not be disturbed by the sale of the stock. In the consumer goods field, the story may be somewhat different, as the two companies now are directly competitive in several products.



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Flexible Couplings
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Sandusky, Ohio, U.S.A.

Columbia Bid Pends in Sale Of Alcoa Plant

SAN FRANCISCO

COLUMBIA STEEL CO., U. S. Steel Corp.'s West Coast subsidiary, may be able to put its proposed new rolling mill in operation in the southern California area sooner than expected if the Justice Department approves purchase of the surplus Alcoa plant at Torrance. Acquisition of this plant would save months of construction time.

The company received approval from the War Assets Administration to purchase the aluminum reduction plant, operated by Alcoa, for $4,181,000.

The plant, which is located near Columbia's mill at Torrance, consists of 55 concrete buildings on 226 acres.

Commenting on the plant purchase, J. Lester Perry, Columbia president, said:

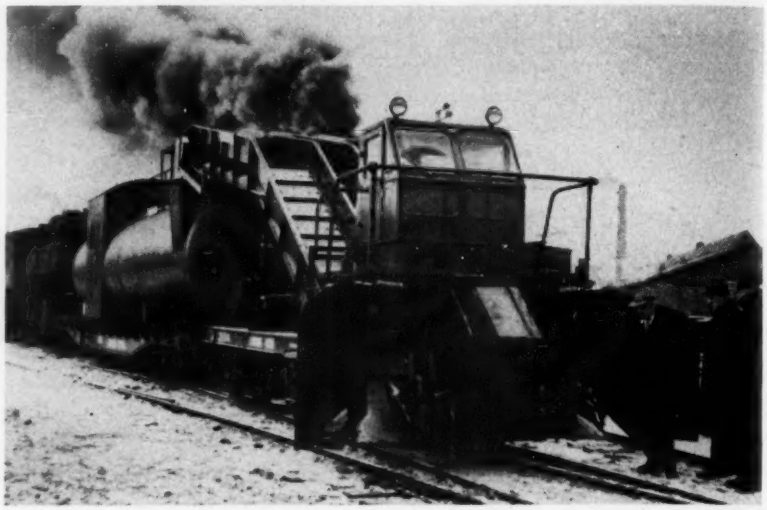
"If acquired, the property will be utilized to house the new cold-reduction sheet mill which Columbia recently announced it would build in the Los Angeles area. The new mill will further process hot-rolled steel coils produced at other existing plants into the sheet steel so greatly needed in the western states.

"Although considerable conversion work will be required, the acquisition should assist in placing the new sheet mill in operation at an earlier date than otherwise possible."

Columbia has estimated cost of the new reduction mill at $30 million. It will have a capacity of 300,000 tons of finished products annually.

The company has been building a similar mill at its plant at Pittsburg, Calif., near San Francisco, and some units of the new mill are now being placed in operation. It is expected that the entire mill will be operating within a few months. The Pittsburg mill is costing the company approximately $25 million.

Although the War Assets Administration has given approval to Columbia's purchase of the Torrance aluminum plant, Justice Department approval also must be obtained before the transaction can be completed.



SNOW MELTER: This 100-ton snow-melter was recently delivered to Canadian National Railways at Montreal. Designed for use in terminal areas, the machine has pronged teeth on two spirals at the front which whip snow from the tracks to two conveyor belts which carry it to the 16,000-gallon melting tank at the rear. NEA photo

Milcor Changes Name to Inland Steel Products

Milcor Steel Co., Milwaukee, fabricator of sheet metal building products and specialty items, has changed its name to Inland Steel Products Co. Change was made to give the firm a name more descriptive of its business and to give formal expression to the company's relationship as a subsidiary of Inland Steel Co.

Inland Steel Products was originally formed in 1902 as Milwaukee Corrugating Co. with production limited to roofing, raincarrying equipment and metal ceilings. As the years went by, other sheet metal building products were added to the line, new branch warehouses were acquired in other cities and the main plant in Milwaukee was doubled in size. In 1930 the name was changed to Milcor Steel Co. Milcor was purchased by Inland and became a subsidiary of that firm in 1936. In addition to its main plant at Milwaukee, the firm has branches at Baltimore, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Kansas City, Mo., Los Angeles and Rochester, N. Y.

The company will continue the "Milcor" trade name to identify its products.

Metallizing Contractors Form New Association

American Metallizing Contractors Association, formed as the culmination of a meeting between representatives of eight metallizing contract shops at St. Louis last month, has been granted a charter by the state of Illinois.

Major function of the organization is to act as a clearing house for technical and statistical information concerning applications and techniques employed in the industry. The group has also set up minimum standards governing various applications of the metallizing process. Adherence to these standards is one of the qualifications for membership.

Another meeting is scheduled for Cleveland, Feb. 28, March 1 and 2.

Officers for the ensuing year are: President, William Fatka, president, Metallizing Inc., Chicago; vice president, H. W. Moore, vice president, Alloy Welding & Mfg. Co., Tulsa, Okla.; secretary-treasurer, Walter B. Meyer, manager of Metallizing Division, John Nooter Boiler Works Co., St. Louis; chairman of the board of directors, Thomas H. Lufkin, supervisor of metallizing, Tranter Mfg. Co., Pittsburgh.

Correspondence with the association should be directed to Mr. Meyer.

Steel Warehouse Group Publishes Freight Tables

American Steel Warehouse Association Inc., Cleveland, has published freight computation tables for mechanical steel tubing.

At a glance, these tables give the freight per 100 feet for sizes of mechanical tubing from 1/8 inch to 10 3/4 inches, with all generally used wall thicknesses and all prevailing freight rates. Weights per foot are in four figures, regardless of decimals. Freight figures are adjusted to the third decimal. A limited supply is available for manufacturers, distributors, buyers and sellers of this tubing.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

National Screw & Mfg. Co., Cleveland, and **Hodell Chain Co.,** Cleveland, have negotiations in progress for a proposed merger.

—o—

Portsmouth Steel Corp., Portsmouth, O., set monthly production records of 43,800 tons of coke, 61,500 tons of ingots and 53,000 tons of blooming mill products in December.

—o—

New York Belting & Packing Co., Passaic, N. J., manufacturer of belting, hose, packing and other products, has appointed Bonner & Barnewall Inc., New York, as its distributor for the New York area.

—o—

Elmira Foundry Co. Inc., Elmira, N. Y., previously affiliated with General Electric Co., has become an integral part of the latter organization's Apparatus Department. Ralph H. Roberts continues as manager of the facility, now called the Elmira Works.

—o—

Columbian Carbon Co., New York, has purchased for $1,420,000 from WAA a carbon black plant at Seagraves, Tex. Columbian had been operating the war-born facility under lease.

—o—

McKiernan-Terry Corp., Harrison, N. J., maker of construction, marine and materials handling equipment, has purchased the buildings and equipment constructed adjacent to its Harrison plant for the Navy for wartime production of aircraft catapults and marine equipment.

—o—

Marco Mfg. Corp., newly formed, has purchased a plant at 21930 Grosbeck Highway, East Detroit, Mich., where automotive stampings and stamping assemblies will be produced. Marco is an outgrowth of Mardigian Corp., Detroit, maker of aircraft engine parts and automotive stampings and assemblies.

—o—

St. Louis Smelting & Refining Co., St. Louis, subsidiary of National Lead Co., has purchased for $210,000 from WAA a milling plant which it operated during the war at Fredericksburg, Mo. Facility will be used to process crude lead ore and nickel-cobalt-copper ore.

—o—

Market Forge Co., Everett, Mass., manufacturer of materials handling equipment, wheels, casters and other products, has named Larson Equipment Co., New York; Charles C. Lewis Co., Springfield, Mass.; and Charles A. Strelinger Co., Detroit, as distributors in these cities and surrounding areas.

—o—

Guardian Steel Corp., Detroit, warehousing firm for steel and aluminum, has been purchased by Joseph E. Schwartzman, formerly executive vice president and director of the firm. He is now president, and Leonard Cousins is vice president and general manager.

—o—

Brown Instrument Co., Philadelphia, subsidiary of Minneapolis-Honeywell Regulator Co., has established offices at 400 Broadway, Denver, and 437 Atlas Bldg., Salt Lake City, Utah. Donald Larcen is in charge of Denver sales and George Winslow will handle similar duties in Salt Lake City.

—o—

Berkeley Industries, Jersey City, N. J., has been formed as the result of a merger of Consolidated Razor Blade Co. Inc., Flashlight Co. of America and Steel Tape Co. of America. Firm will manufacture razor blades, lighters, steel rules, pocket knives and venetian blind strip.

—o—

Scott Steel Co., Chicago, is no longer the sales representative for Granite City Steel Co., Granite City, Ill. Scott's arrangements with Granite City expired Dec. 31, 1947.

—o—

Parker Appliance Co., Cleveland, has named B. W. Rogers Co., Akron, as a distributor for its industrial tube fittings and valves.

—o—

Atomic Energy Commission, Washington, has consolidated reactor research, previously planned for both the Clinton National Laboratory at Oak Ridge, Tenn., and for the Argonne National Laboratory near Chicago, at the Argonne facility. The Clinton laboratory will be used for developments in chemical engineering in a project soon to be undertaken by Carbide & Carbon Chemicals Corp.

—o—

Detroit Testing Laboratory, Detroit, a commercial research organization, has been sold to a group headed by Douglas Dow who is the new president and general manager, replacing William P. Putnam, retired. Mr. Dow was formerly director of commercial research for Detroit Edison Co.

—o—

Bristol Brass Corp., Bristol, Conn., has opened a warehouse at 1607 S. Broadway, Dayton, O., which will supply Bristol's sheet, rod and wire.

—o—

Aluminum Co. of America, Pittsburgh, has transferred its Aluminum Ore Co.'s fluorspar mining and milling properties at Rosiclare, Ill., to Alcoa Mining Co., another subsidiary. Allen B. Williams, president of Aluminum Ore Co., becomes a vice president of Alcoa Mining, in charge of fluorspar operations in addition to his previous duties.

—o—

United Engineering & Foundry Co., Pittsburgh, announces that, effective Jan. 1, $1000 of non-contributory group life insurance will be continued on all employees retiring under its retirement plan. No physical examination is required, and there is no cost to the employee.

—o—

General Electric Co., Schenectady, N. Y., reports General Electric S. A. Argentina, has signed an $18 million contract with Argentine State Railways to supply Argentina with 95 diesel-electric locomotives within the next three years.

—o—

Department of Commerce announces that the February coal export quota is 3,825,000 tons. January export quotas totaled 3,500,000 tons. The February increase was made possible by recent high level of bituminous production.

—o—

Nelco Tool Co., manufacturer of tungsten carbide cutting tools, has moved from Brooklyn, N. Y., to a plant recently purchased at 266 Center St., Manchester, Conn. Key men and a majority of the employees made the move with the company.

—o—

Pressed Metal Institute, Cleveland, has published its fourth edition of *Blue Book of Stamping Manufacturers.* Publication contains a listing of members, geographically, data regarding facilities and other pertinent information.

—o—

Ohio State University, Columbus, O., has established a department of welding engineering.

—o—

T. B. Wood's Sons Co., Chambersburg, Pa., manufacturer of equipment for the mechanical transmission of power, has published a brochure describing its manufacturing facilities.

The Business Trend

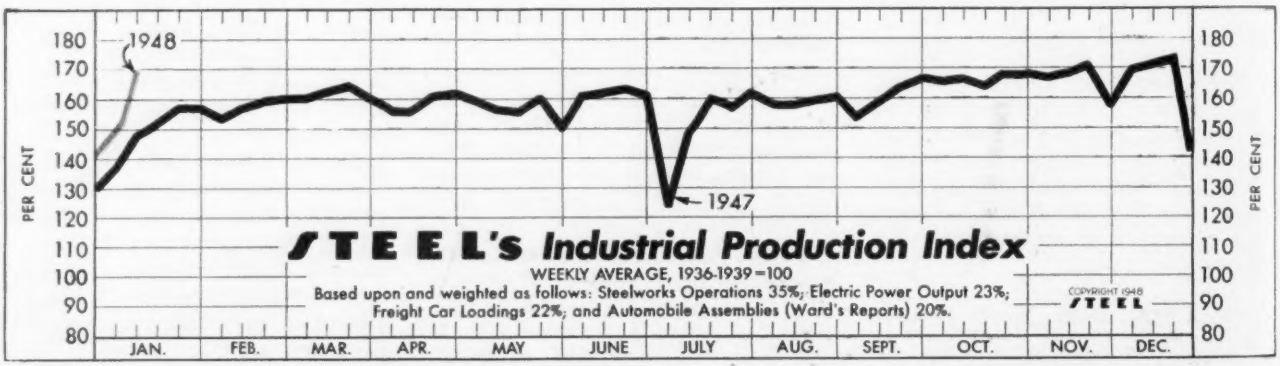
COMPLETE recovery of industrial operations from the effects of holiday curtailments was evident in the week ended Jan. 10. STEEL's index of industrial production in that week registered a sharp gain of 21 points to reach 169 per cent (preliminary) of the 1936-1939 weekly average. All the important business indicators, excepting freight carloadings which are now seasonally affected, have pushed near their postwar peak levels.

VOLUME—Sales by manufacturers, at $16 billion in October, topped previous levels and were more than $1 billion greater than in September and nearly $4 billion above the like 1946 month, Department of Commerce reports. Of this total, 44 per cent or $6.9 billion represented the value of shipments of the durable goods industries. This proportion has been steadily increasing since early 1946 and now is the same as in the immediate postwar period and in 1929. Volume of new orders for manufacturers as a whole remained near the high September level. Book value of manufacturers' inventories advanced during October, with most industries showing a 1 to 2 per cent gain. Declines in inventories, however, were reported by the blast furnace portion of the iron and steel industry, for the entire nonferrous metals group and for the chemical industry. November estimates place manufacturers' average daily shipments at 5 per cent above the October figure.

RAILROADS—Net operating income of Class I railroads in November totaled $65,577,488 compared with $64,122,214 in the like 1946 month, according to Association of American Railroads. For the first 11 months of 1947 net operating income was $700,834,369 compared with $516,074,515 in the same period of 1946. Estimates of freight carloadings for the first quarter, 1948, indicate a 3.5 per cent increase over the same period in 1947, with 11 of the 13 Shippers Advisory Boards expecting improvements in loadings over last year. In all, 7,920,416 cars will be loaded in the quarter, the boards predict.

ENTERPRISE—New business incorporations dropped in November to the smallest total in two years, according to Dun & Bradstreet Inc. With 7855 companies chartered in that month, the 11-month total was brought to 102,479, 16.6 per cent below the figure for the comparable 1946 period. Number of commercial and industrial failures also showed a decline from October, although at 313 the number of firms going out of business in November was greater than in any November since 1942. Industrial failures were most numerous among machinery manufacturers.

PRICES—Goods and services bought at retail by moderate-income families in large cities cost 0.7 per cent more between mid-October and mid-November, with the consumers' price index pushing to 164.9 per cent of the 1935-1939 average—an all-time high, Bureau of Labor Statistics reports. Wholesale prices in the week ended Jan. 3 continued their upward surge for the ninth consecutive week, reaching a new postwar high of 164.4 per cent of the 1926 average.



The Index (chart above): Week Ended Jan. 10 (preliminary) 169 Previous Week 148 Month Ago 171 Year Ago 148

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	97.0	97.0	97.5	90
Electric Power Distributed (million kilowatt hours)	5,278	4,868	5,327	4,853
Bituminous Coal Production (daily av.—1000 tons)	1,924	1,390	2,217	1,915
Petroleum Production (daily av.—1000 bbl.)	5,313	5,291	5,253	4,531
Construction Volume (ENR—Unit $1,000,000)	$85.7	$54.4	$95.6	$90.4
Automobile and Truck Output (Ward's—number units)	112,219	65,573	117,902	64,828

* Dates on request. † 1947-48 weekly capacity is 1,749,928 net tons.

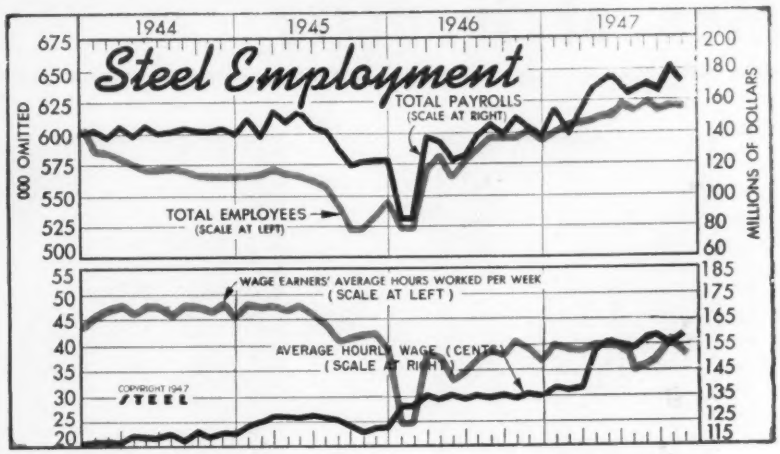
TRADE				
Freight Carloadings (unit—1000 cars)	825†	682	854	831
Business Failures (Dun & Bradstreet, number)	87	58	87	37
Money in Circulation (in millions of dollars)‡	$28,658	$28,971	$28,874	$28,748
Department Store Sales (change from like wk. a yr. ago)‡	+9%	+27%	+7%	+38%

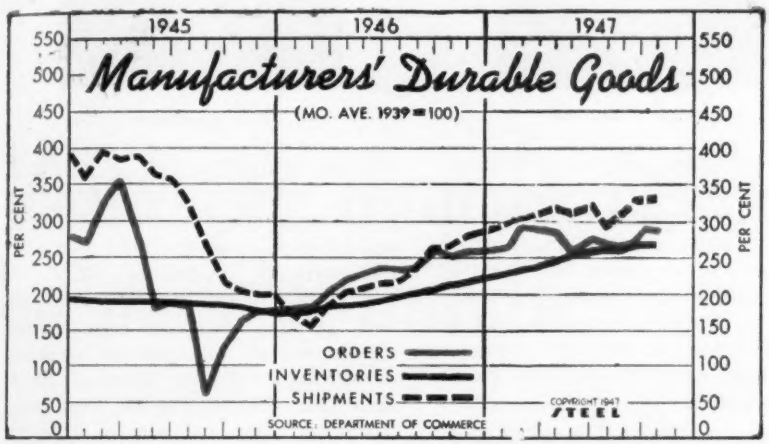
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wage† (cents)	
	1947	1946	1947	1946	1947	1946
Jan.*	601	522	$155.8	$84.9	138.1	131.4
Feb.*	607	522	139.5	84.9	137.0	131.4
Mar.	609	570	150.6	138.8	137.9	135.1
April	611	582	168.3	134.3	153.3	134.1
May	615	563	175.8	121.4	155.6	135.8
June	623	578	167.6	125.6	154.7	134.4
July	623	585	163.2	138.0	153.9	135.1
Aug.	625	596	169.1	145.2	155.6	134.6
Sept.	618	596	168.9	139.6	157.1	136.2
Oct.	620	596	180.1	150.6	154.6	134.1
Nov.	624	600	171.0	143.4	158.7	136.7
Dec.	...	594	....	137.2	....	135.2

† Monthly average. * Figures for January and February, 1946, are merely averages derived from a report that combined those two strike-affected months.





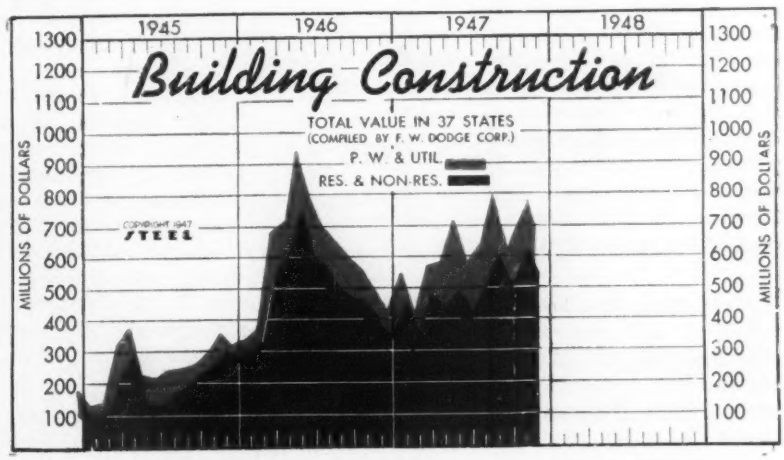
Index of Manufacturers' Durable Goods

(Mo. Ave. 1939=100)

	Orders		Shipments		Inventories	
	1947	1946	1947	1946	1947	1946
Jan.	270	176	292	169	226	171
Feb.	295	179	311	153	232	174
Mar.	288	203	312	183	238	181
Apr.	279	219	320	203	244	182
May	256	224	313	207	251	184
June	270	231	323	212	254	189
July	260	229	287	216	256	195
Aug.	261	232	301	233	259	200
Sept.	292	254	336	259	261	206
Oct.	290	248	338	262	264	211
Nov.	...	254	...	278	...	215
Dec.	...	271	...	292	...	220
Ave. ..	...	227	...	222	...	194

Construction Valuation in 37 States (Unit—$1,000,000)

	Total	Public Works Utilities		Residential and Non-residential	
	1947	1947	1946	1947	1946
Jan.	571.6	113.9	50.2	457.7	307.3
Feb.	442.2	90.5	64.7	351.6	322.7
Mar.	596.8	122.0	143.6	474.8	554.0
Apr.	602.3	161.4	128.1	441.0	606.8
May	742.8	252.9	197.9	490.0	754.6
June	605.1	185.7	202.5	419.4	605.5
July	660.3	165.9	153.1	494.4	564.9
Aug.	823.2	223.5	184.4	599.7	495.6
Sept.	650.0	141.5	156.4	508.4	463.5
Oct.	793.3	165.9	112.8	627.4	460.4
Nov.	715.1	181.5	121.8	533.6	382.0
Dec.	....	....	115.9	....	341.4
Totals		....	1,631.4	....	5,858.7



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,926	$12,911	$13,671	$14,072
Federal Gross Debt (billions)	$256.5	$256.8	$257.7	$259.4
Bond Volume, NYSE (millions)	$28.4	$22.6	$34.2	$27.1
Stocks Sales, NYSE (thousands)	5,178	4,818	5,911	5,146
Loans and Investments (billions)†	$64.8	$65.3	$65.0	$56.2
United States Gov't. Obligations Held (millions)†	$37,227	$37,366	$37,560	$36,029

† Member banks, Federal Reserve System.

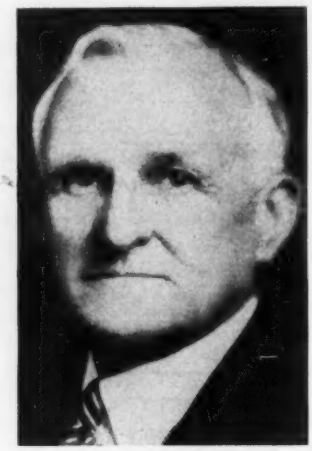
PRICES

STEEL's composite finished steel price average	$78.05	$78.05	$76.09	$69.14
All Commodities†	164.4	163.0	161.0	139.1
Industrial Raw Materials†	184.5	183.4	180.0	153.1
Manufactured Products†	156.6	155.0	153.3	134.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

WILLIAM B. WALLIS



DONALD B. GILLIES

F. L. MEACHAM

William B. Wallis, president of Pittsburgh Lectromelt Furnace Corp., has been nominated for president of the American Foundrymen's Association in 1948-49. Choice of the association to succeed **Max Kuniansky,** vice president-general manager of Lynchburg Foundry Co., Lynchburg, Va., whose term expires in July, Mr. Wallis is the present vice president. He served as an international director from 1943 to 1946. **Edwin W. Horlebein,** president, Gibson & Kirk Co., Baltimore, is the nominating group's selection for vice president. On his retirement as president, Mr. Kuniansky will serve one year as an AFA director, succeeding **Sheldon V. Wood,** president-general manager of Minneapolis Electric Steel Castings Co., Minneapolis, immediate past president of the association.

—o—

Alvin Hass has been elected vice president and general manager of Hanchett Mfg. Co., Big Rapids, Mich. He has been associated for 17 years with Yates-American Machine Co., Beloit, Wis., as president and general manager.

—o—

K. R. Beardslee, formerly vice president in charge of sales, Carboloy Co. Inc., Detroit, has become vice president and marketing manager, following an expansion of the company's marketing organization. In this capacity Mr. Beardslee is responsible for all activities affecting the marketing of company products, including sales, merchandising, advertising, market research, sales promotion, customer services, and sales education. Under the new set-up **J. E. Weldy,** who has been named sales manager, will direct all sales, while all merchandising activities will be directed by **E. C. Howell,** appointed merchandising manager. Market research, budgeting, and sales order handling will be under the direction of **G. M. Chandler,** business services manager. Training activities will be directed by **J. M. Bertotti,** manager of training, and formerly director of sales training.

—o—

Donald B. Gillies has resigned as vice president and director of Republic Steel Corp., Cleveland, after 55 years of activity in the mining and steel industries. He will remain, however, with Republic as an adviser and consultant on mining. In 1918 he became vice president of the Corrigan-McKinney Co., and later became president. In 1935, when that company consolidated with Republic, Mr. Gillies was made a vice president of Republic. In this capacity he has been the company's chief counsellor on mining problems.

—o—

Cooper-Bessemer Corp., Mt. Vernon, O., announces the following promotions of three of its sales executives to positions of vice president: **J. W. Reed,** Atlantic Coast manager of Gas Engine and Compressor Division; **A. A. Burrell,** southwestern district manager, with headquarters in Dallas, Tex.; and **B. L. Potter,** midcontinent manager with headquarters at Tulsa, Okla.

—o—

Paul H. Maurer, former executive engineer of Redmond Co. Inc., Owosso, Mich., has returned to the company after a three-year absence to assume the newly created post of director of engineering. Coming to Redmond Co. Inc., originally from the Hudson Motor Car Co., in 1943, Mr. Maurer left Redmond 18 months later to become manager of industrial sales and later chief engineer for National Pneumatic Co., in Rahway, N. J.

—o—

F. L. Meacham has been elected vice president and general manager of Chicago Vitreous Enamel Products Co., Cicero, Ill. He has been manager, sales and service, for the company since 1943, and since that time has also directed the activities of the Frit Division.

—o—

W. A. Roberts and **W. C. Johnson,** executive vice presidents of Allis-Chalmers Mfg. Co., Millwaukee, have been elected to the firm's board of directors. They succeed the late **Dr. Charles E. Albright,** and **Harold S. Falk,** resigned.

—o—

Bay E. Estes Jr. has been appointed director of commercial research, United States Steel Corp. of Delaware. He succeeds **Kemp G. Fuller,** resigned. Mr. Estes has been serving as assistant manager of the division.

—o—

Harry H. Rose has been named general sales manager of Simmons Fastener Corp., Albany, N. Y. During the last three years he has been a sales engineer for this company, and prior to that, was an engineer for the Simmons Machine Tool Corp., the parent company.

—o—

William T. Kelly Jr. has been elected first vice president of American Brakeblok Division, American Brake Shoe Co., New York. He has served as vice president of the company since 1946, and has been associated with the organization for the past 20 years. In addition to his new

Said the man in Erie to the man in Duluth:

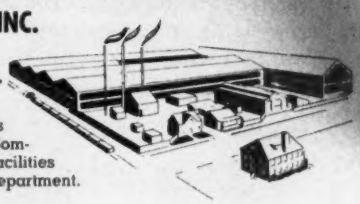
"MAY I BORROW YOUR HOE?"

THE Barium affiliates are good neighbors working together to produce steel and steel products for you. They share technical and managerial skill to produce the best in steel. This interchange of knowledge is accumulative. It builds up at the point of sale. Go where you will in the Barium neighborhood and you'll find this neighborly spirit reflected in the quality of the service and products that you buy from Barium.

One of the sixteen Barium Good Neighbors

BARIUM STEEL AND FORGE, INC.
CANTON, OHIO
Subsidiary of Barium Steel Corp.

Producers of basic open hearth steel, large and small forgings in all grades of alloy stainless and tool steel. Complete machining and heat treating facilities with a fully staffed metallurgical department.



Barium
STEEL CORPORATION
STEELWRIGHT TO THE NATION

WE MELT, CAST, FORGE, STAMP, MACHINE AND FABRICATE STEEL

BARIUM STEEL CORPORATION
EXECUTIVE OFFICES: 25 BROAD STREET, NEW YORK, N. Y.

American Steel Tractor Corp., Canton, Ohio • Barium Steel & Forge, Inc., Canton, Ohio • Barium Equipment Corp., Barium Steel Export, Inc. • Bayonne Bolt Corp., Bayonne, N. J. • Central Iron and Steel Co., Harrisburg, Pa. • Clyde Iron Works, Inc., Duluth, Minn. • The Cuyahoga Spring Co., Cleveland, Ohio • The Geometric Stamping Co., Cleveland, Ohio • Perma-Jack Corp., Cleveland, Ohio • Porcelain Steels Corp., Cleveland, Ohio • The Detroit Steel Casting Co., Detroit, Mich. • Kermath Manufacturing Co., Detroit, Mich. • Kermath (Canada) Ltd., Toronto, Ont., Can. • Erie Bolt & Nut Co., Erie, Pa. • Globe Forge, Inc., Syracuse, N. Y. • Sheffield Iron & Steel Co., Sheffield, Ala. • Wiley Manufacturing Co., Mountville, Pa., and Port Deposit, Md. • Republic Industries, Inc., N. Y.

duties, Mr. Kelly will continue as president of the Kellogg and Engineered Castings Divisions, positions which he has held since 1945 and 1946, respectively.

—o—

George T. Motock has been named director of research and development, Champion Rivet Co., Cleveland and East Chicago, Ind.

—o—

American Steel & Wire Co., U. S. Steel subsidiary, announces the appointments of **A. J. King,** chief sales engineer for wire rope in the general sales department, and **Stephen B. Metcalfe** as general superintendent of the New Haven and Trenton Works to succeed Mr. King.

—o—

Robert W. Richardson has been appointed by Calumet & Hecla Consolidated Copper Co., Detroit, to the newly created position of commercial research engineer, with headquarters at Calumet, Mich.

—o—

John E. Martin, former vice president and director of American Type Founders Inc., New York, has been named president of Firestone Steel Products Co., subsidiary of Firestone Tire & Rubber Co., Akron.

—o—

Charles L. Beard, formerly vice president, secretary and treasurer of Bell Aircraft Corp., Niagara Falls, N. Y., has been elected secretary-treasurer of Acme Machine & Pattern Co. Inc., Buffalo.

—o—

Grover M. Hoff has retired as superintendent of the Foundry Division at the Pittsburg, Calif., plant of Columbia Steel Co., subsidiary of U. S. Steel Corp.

—o—

W. A. Harrington has been named manager of the San Pedro shipyards of Bethlehem Steel Co. He had served as assistant manager. He now succeeds **E. C. Rechtin,** who has been named to an executive post on the Atlantic coast.

—o—

J. Gill Stanley has been appointed manager of the Buffalo branch and district sales office of Columbia Steel & Shafting Co., Edgar T. Ward's Sons Co. Division and Summerill Tubing Co. Division, Pittsburgh.

—o—

Ben H. Sachs Jr. has joined Helburn Engineering, Cincinnati representative for American Air Filter Co. Inc., Louisville. He will represent the Air Filter, Dust Control and Engine and Compressor Divisions.

—o—

Rufus J. Wysor, former president of Republic Steel Corp., Cleveland, is now project manager for Overseas Consultants Inc., Hattori Bldg., Tokyo, Japan.

—o—

James E. Goodman has been appointed general manager, Buick-Oldsmobile-Pontiac Assembly Division of General Motors Corp., New York.

—o—

R. H. Webber has been appointed works controller at the Halcomb Works, Syracuse, N. Y., of Crucible Steel Co. of America.

—o—

Clyde W. Summerville, an associate with **William Pigott** in the Seattle Steel Co., Seattle, has been elected president of the company.

—o—

Fort Duquesne Steel Co., Pittsburgh, processor and distributor of flat rolled steel products, has appointed **L. D. Catlin,** Rochester, as its district sales representative in that city and the surrounding area.

—o—

Frank J. Grumbach has been appointed district representative, Berger Mfg. Division, Republic Steel Corp., in Charlotte, N. C.

—o—

Bailey Meter Co., Cleveland, announces the appointment of **G. R. Mays** as manager of its St. Louis branch office. He succeeds **L. E. Evans,** resigned.

—o—

Joseph F. Eckel has been promoted to manager of the Lynn River Works, General Electric Co. He succeeds **George M. Stevens,** retired after 46 years' service.

—o—

T. S. Ferrel has been appointed manager, steel department, American Wholesale Hardware Co., Long Beach, Calif., succeeding **H. F. Bryant.**

—o—

Robert H. Jewett, formerly chief of preliminary design, has been named chief project engineer-pilotless aircraft by Boeing Airplane Co., Seattle. He has been succeeded as chief of preliminary design by **George C. Martin,** formerly project engineer for the radically new Boeing XB-47 Stratojet bomber, now undergoing tests. **Robert Plath** has been named acting project engineer for the XB-47.

—o—

James A. McColm Jr., Youngstown, has been named executive vice president, treasurer and director of Taylor Wilson Mfg. Co., Pittsburgh.

—o—

Donald M. Laflin, eastern district sales manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been appointed assistant general sales manager of the company. Mr. Laflin served as assistant chief, machine tool section, National Defense Commission, Office of Production Management, for a year and a half.

—o—

H. H. Benninger, former assistant chief metallurgist, Chrysler Corp., Detroit, has become associated with Peninsular Steel Co., Detroit, as metallurgical contact engineer.

—o—

William A. Metcalf has been appointed sales representative in the Kansas City, Mo., territory for Reliance Electric & Engineering Co., Cleveland. Mr. Metcalf is associated with Carl P. Lohr Co., which has represented Reliance in the St. Louis area for the past 15 years. **Clifford C. Tippit,** formerly a methods supervisor, has been named manager of a newly created order and planning department.

—o—

A. G. Wood, superintendent for the past 18 years of Crucible Electric Steel Co., Homestead, Pa., has joined the Bedford Tool & Forge Co., Bedford, O., as superintendent.

—o—

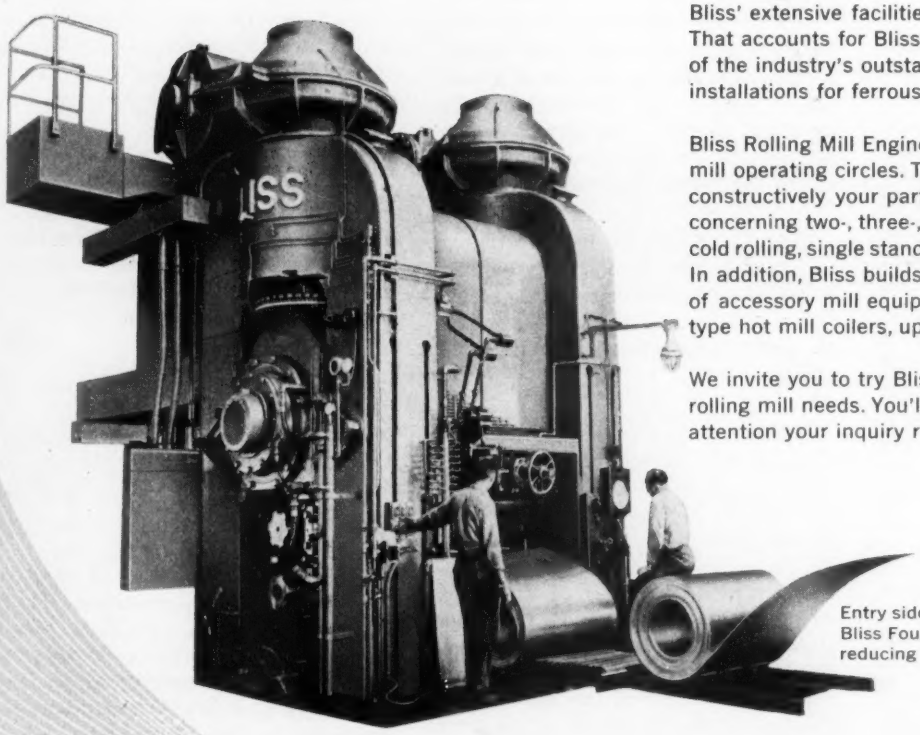
L. G. Mehler has been appointed superintendent, blast furnaces, Farrell Works, Sharon Steel Corp., Sharon, Pa. He succeeds **P. E. Angle,** who has retired. Mr. Angle held the position of superintendent, blast furnaces, at Farrell Works, Carnegie-Illinois Steel Corp., when it was taken over by Sharon Steel Corp. in 1945, and remained in this same capacity with Sharon Steel until his retirement.

—o—

T. P. Walker has retired as president and manager of Queen City Forging Co., Cincinnati, after 35 years in that position. **Walter Dinkelman** has been elected president and treasurer, **O. Bruce Walker,** vice

L. G. MEHLER

Rolling Mill "know-how" for the asking...



Entry side of 21" x 50" x 72" Bliss Four-High Mill for cold reducing of aluminum.

No rolling mill equipment problem is too large for Bliss' extensive facilities—design and production-wise. That accounts for Bliss' ability to work out some of the industry's outstanding sheet and strip mill installations for ferrous or non-ferrous application.

Bliss Rolling Mill Engineers are well-traveled in mill operating circles. They're equipped to analyze constructively your particular requirements concerning two-, three-, or four-high mills for hot and cold rolling, single stand reversing or tandem operation. In addition, Bliss builds cluster mills and a variety of accessory mill equipment including mandrel type hot mill coilers, upcoilers, slitters, reels, etc.

We invite you to try Bliss on your current rolling mill needs. You'll like the prompt attention your inquiry receives.

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E. W. BLISS COMPANY

Detroit 2, Michigan

- rolling mills
- mechanical and hydraulic presses
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president and production manager, and **Vernon C. Hoffman,** secretary of the company.

—o—

John M. Ivory has resigned as vice president and treasurer of U. S. Time Corp. to become vice president of Hunter Douglas Corp., Riverside, Calif.

—o—

John T. Brown, recently vice president, Chain Belt Co., Milwaukee, has been elected vice president and director of J. I. Case Co., Racine, Wis.

—o—

Kennametal Inc., Latrobe, Pa., announces the opening of its new Eastern district office at 6 West Broadway, New York. The new office is in charge of **L. D. Morton** as eastern district manager, and **J. G. Brady** will serve as representative.

—o—

Allen W. Ainsworth has been appointed manager, Steel Division, Horace T. Potts Co., Philadelphia, distributor of steel and steel products, and **Thomas I. Potts** has been appointed purchasing agent. Each is a partner in the company. **Curtis R. Spencer,** associated with the company since 1929, has been named office manager. These changes follow the recent retirement of **Guy P. Bible** from general managership of the company, and the appointment of his successor, **Claude Mengle.** Both are partners in the organization, and, while Mr. Bible has retired from active duty after 36 years with the company, he will continue as a partner.

—o—

Clifton W. Brannon has been appointed secretary and general counsel for R. G. LeTourneau Inc., Peoria, Ill. He succeeds **Frederick V. Arber,** who resigned. Mr. Brannon has been affiliated with the LeTourneau industry for the past eight years as head of the legal department for the Toccoa, Ga., and Longview, Tex., plants, and is also vice president of the Texas Casualty Insurance Co.

—o—

Robert C. Dunbar has been appointed West Coast representative, American Hoist & Derrick Co., St. Paul, Minn. He will represent the Small Products Division. He formerly had been connected with the Steel & Tube Division of Republic Steel Corp., and more recently engaged in sales work on the West Coast.

—o—

Perfect Circle Corp., Hagerstown, Ind., announces the retirement of **George Keagy** from the position of Hagerstown plant manager. He will retain his connection with the corporation as a member of the board of directors. **George Myers,** formerly assistant plant manager, has been named plant manager.

—o—

H. C. Peinert has been promoted to production manager of the high explosive section of the explosive department of E. I. du Pont de Nemours & Co., Wilmington, Del. **W. D. Garwood,** production superintendent at the Repauno plant, Gibbstown, N. J., has been named production manager of the special products and black powder section, succeeding Mr. Peinert.

—o—

C. Paul Denckla has been appointed general sales manager for the Philadelphia office of Dayton Rogers Mfg. Co., Minneapolis, Minn., succeeding the late **E. Graepp.**

—o—

Calvin H. Corey has been named division manager in charge of a new office opened in Washington by Brooks & Perkins Inc., Detroit, which will service its Army and Navy contracts for magnesium fabrications.

—o—

Robert E. Lewis has been appointed assistant to the Youngstown district manager of operations, Youngstown Sheet & Tube Co. He succeeds **John H. Krehl,** who retired after 46 years of service.

—o—

Mississippi Valley Structural Steel Co., Chicago, announces the following changes in its official personnel: Election of **R. D. Wood** of Chicago as chairman of the board, succeeding **W. M. Wood** of Decatur, Ill., retired. Election of **J. B. Butler** of St. Louis, as president, succeeding **R. D. Wood.** Promotion of **E. T. Blix,** manager of the Melrose Park plant, to vice president and manager of the same plant. Election of **F. C. Knorr** of Decatur as secretary in place of **Harvey H. Cosley** of Chicago, retired. Election of **A. H. Bennett** of Decatur as treasurer. Appointment of **R. R. Bramhall** as manager of the St. Louis plant.

—o—

James McWhirter has been placed in charge of fluorine product process development and manufacture for Pennsylvania Salt Mfg. Co., Philadelphia. He has been superintendent of the company's Natrona, Pa., plant.

—o—

John C. Smaltz has been elected president, McKiernan-Terry Corp., Harrison, N. J., and **O. W. Shattuck,** manager of the Dover, N. J., plant, a vice president. **L. H. Buttenheim** will continue to serve the corporation as vice president and treasurer.

ROBERT F. GLADFELTER

—o—

Robert F. Gladfelter has been appointed general sales manager, Detroit Power Screwdriver Co., Detroit. He succeeds to the position held for many years by his father, the late **R. H. Gladfelter.**

—o—

Peter F. Hurst has been elected president of Aeroquip Corp., Jackson, Mich. He was instrumental in the organization of the corporation in 1940, and previously was executive vice president and general manager.

—o—

C. B. McGehee, formerly general manager of sales, Truscon Steel Co., Youngstown, has resigned that position to assume the presidency of William H. Harman Corp., Wilmington, Del.

—o—

Elected as new officers of Electric Industrial Truck Association, Long Island City, N. Y., are: **F. J. Shepard Jr.,** treasurer, Lewis-Shepard Products Inc., Watertown, Mass., as president; and **W. Van C. Brandt,** manager, motive power sales, Electric Storage Battery Co., Philadelphia, as vice president of the association. **Charles F. Kells** of New York, managing director of the association, has been elected secretary-treasurer.

—o—

Edward J. Bond, associated with Ford Motor Co., Dearborn, Mich., for 14 years, has been promoted to plant manager of the new Lincoln-Mercury assembly plant in Los Angeles. He began his career with Ford as an assembly line worker in the Dallas, Tex., plant in 1934.

—o—

Harvey E. Schach has been appointed sales manager of the Power Brake Division, Midland Steel Products Co., with headquarters in De-

D. E. VAN DEUSEN

Elected president, Cutting Tool Manufacturers' Association. Noted in STEEL, Jan. 12 issue, p. 63

SIR ANDREW McCANCE

Will take office as president of British Iron & Steel Institute next spring. Noted in STEEL, Jan. 12 issue, p. 62

J. J. MULLEN JR.

Has been elected president, Moloney Electric Co., St. Louis. Noted in STEEL, Dec. 29 issue, p. 44

troit. Associated with the division for 17 years, Mr. Schach succeeds **C. F. Smith,** resigned to devote full time to private interests in Cleveland. **A. R. Leukhardt** has been appointed assistant sales manager of the Power Brake Division.

—o—

William F. Riley, formerly connected with the scrap and salvage industry with James Flett Organization Inc., Chicago, has joined the Sales Division, Luria Bros. & Co. Inc., Philadelphia. He will have headquarters at the Cleveland office.

—o—

Michael Leyava, who until recently was district manager of the Cleveland division of James Flett Organization Inc., Chicago, has been elected president, Ajax Steel & Supply Co., Erie, Pa. He began his career in the steel business 17 years ago with Otis Steel Co., Cleveland. During the war, Mr. Leyava was deputy chief of the salvage and scrap section, Industrial Division, Office of the Chief of Ordnance, Washington, where he handled allocation of iron and steel scrap and nonferrous metals, and in 1945 took charge of stockpiling of strategic metals and alloys. **Garfield A. Jenkins,** formerly assistant to Mr. Leyava at Flett, has been elected secretary of Ajax Steel & Supply Co.

—o—

Arthur E. A. Mueller has been named president, Marathon Foundry & Machine Co., Wausau, Wis. He succeeds the late **O. C. Lemke,** founder of the firm and with whom Mr. Mueller had been associated since early 1941.

—o—

John B. Caine, metallurgist, Sawbrook Steel Castings Co., Lockland, O., has been elected chairman of the electric furnace steel committee, American Institute of Mining & Metallurgical Engineers. He succeeds **W. J. Reagan,** associate professor of metallurgy, Pennsylvania State College.

—o—

Partners of Pickands Mather & Co., Cleveland, announce the retirement of **W. K. Bromley** as manager of the company's coal department. He has been with the company for over 38 years. He is succeeded in the department by **John R. Chandler,** who has been admitted as a partner of the firm. Mr. Chandler became associated with Pickands Mather in 1928.

—o—

Paul S. Strecker has been appointed assistant to the president of E. W. Bliss Co., Detroit. He will continue to serve as personnel director of the company. **J. J. Radigan,** personnel manager at the Bliss plant in Brooklyn, has been promoted to assistant director of personnel.

—o—

E. W. Whitman, for the past two years assistant superintendent of the Morris Mine in Ishpeming, Mich., has been promoted to superintendent of that operation of Inland Steel Co., Chicago. **John H. Strome** has been promoted to the position of safety director for the iron ore and limestone operations of Inland Steel Co. **W. T. McCormick,** former safety director, will now devote the majority of his time to his duties as supervisor of occupational hygiene for the company, with headquarters at Indiana Harbor, Ind.

OBITUARIES . . .

W. S. Mosher, 74, chairman of the board of Mosher Steel Co., Houston, Tex., died Jan. 8. He had been connected since 1890 with the steel company founded in Dallas by his father, and was president of the company from 1921 to 1944.

—o—

William H. Hulick Sr., 94, retired president, Warren Pipe & Foundry Co., New York, died recently at his home at Bedford Village, N. Y.

—o—

James Coulter, 82, retired as president and treasurer of James Coulter Machine Co., Bridgeport, Conn., died Jan. 2. He was the founder and vice president of the old Automatic Machine Co. from 1900 to 1938, when the new company was formed.

—o—

P. W. Mulder, for many years associated with Almont Mfg. Co., Imlay City, Mich., died recently.

—o—

H. C. Esgar, sales engineer, Stainless Steel Division, Carnegie-Illinois Steel Corp., Pittsburgh, died recently.

—o—

C. V. Roberts, 85, who founded the Roberts & Mander Stove Co., Hatboro, Pa., in 1903, died Jan. 4.

—o—

William P. Mosely, 70, connected with Yale & Towne Mfg. Co., Stamford, Conn., for 39 years before he retired in 1939, died Jan. 8.

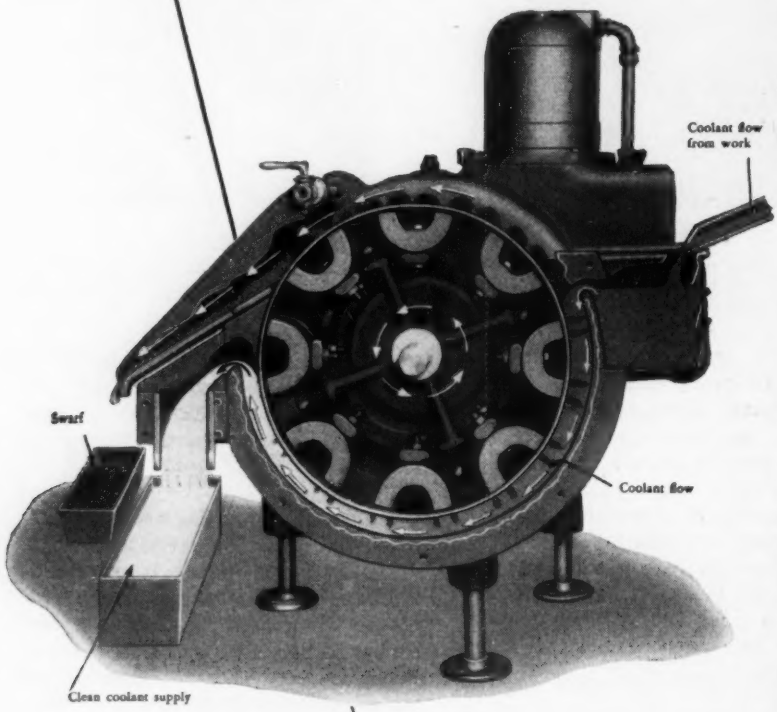
—o—

James S. Kenyon, president, Tremont Nail Co., Wareham, Mass., died recently.

—o—

Prescott R. Lovejoy, 45, president and general manager, Lovejoy Tool Co. Inc., Springfield, Vt., died recently.

Why Not Try "A CLEAN SWEEP"-



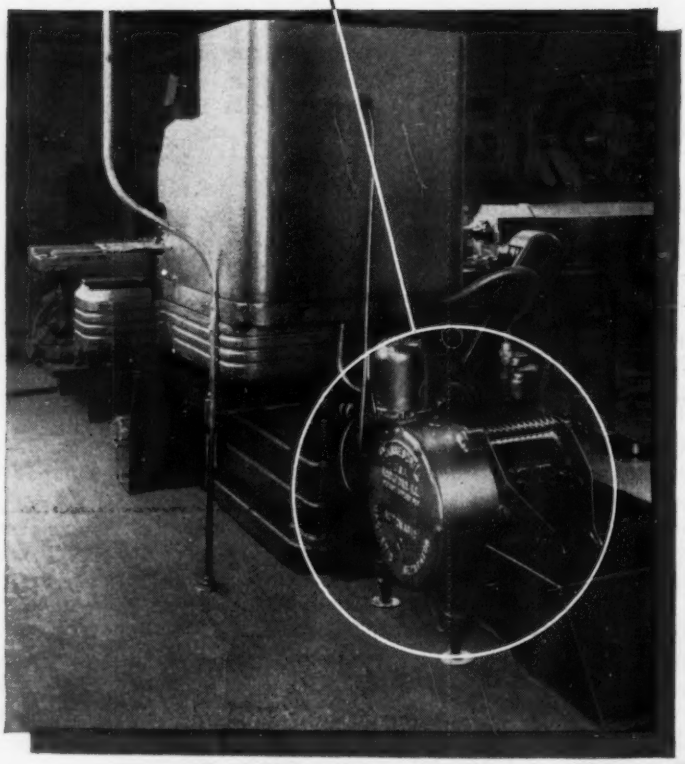
IN REMOVING SLUDGE AND SEDIMENT FOR REDUCED DOWN-TIME?

BARNESDRIL AUTOMATIC COOLANT SEPARATOR SAVES 22 HOURS MACHINE DOWN-TIME PER MONTH

Accumulated sludge and sediment accounted for 2 hours down-time every other day to clean out the machine on a high-production thread grinding operation. This manufacturer found that the installation of a BARNESDRIL Automatic Coolant Separator saved this valuable time for greater production, and resulted in the need for clean-out only once in six months continuous operation. As the coolant returns through the Separator, it flows between a shunt plate and the Magnetic Drum to which swarf, sludge and abrasive particles attach themselves. As the drum revolves these are "swept" out and deposited in a convenient waste disposal pan for easy removal.

On the basis of down-time saved alone, the production department estimates that this Separator has paid for itself in six months time. Equally important savings are found in production quality and tooling costs. The grinding wheel loads-up less frequently and requires fewer dressings. Finish on ground work is greatly improved. Clean coolant lines add to the operator's comfort. Coolant life is prolonged to normal structural breakdown.

The BARNESDRIL Automatic Coolant Separator is the easy, convenient, modern way to maintain high production metal cutting equipment with minimum costs. Ask your BARNESDRIL representative about the Magnetic-Automatic Coolant Separator today. Details on cost, capacity and ease of installation supplied without any obligation.



ADVANCE INFORMATION:

Write for a copy of the Magnetic-Automatic Coolant Separator bulletin. A copy will be mailed promptly. Ask for Bulletin B-1515.

BARNES DRILL CO.

854 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

Engineering News . . . AT A GLANCE

THE "TRAVELING" GRINDER—To demonstrate advances incorporated in its latest surface grinder, H. Leach Machinery Co. is sending the machine on an international tour in a mobile unit designed for the purpose. The Providence, R. I. concern intends to display the new development on the "doorsteps" of dealers and agents throughout the U. S., Canada and Mexico.

CUTS DRAWING TIME—Electrical method for drilling small diamond dies used for drawing extremely hard fine wire, developed by the National Bureau of Standards, Washington, is reported to eliminate almost 100 manhours from conventional processes. It also is expected to revolutionize fine wire drawing by means of diamond dies.

VIBRATION SPOTTERS—Electromagnetic pickups each consisting of a wire coil suspended near a magnet, are being used by Boeing to detect stress in form of engine and propeller vibration on its Stratocruisers. The "spotters" are placed at points near engines and props. Vibrations at each point are converted by the pickups into electric current. Use of an oscillograph to amplify and trace the current provides engineers with an accurate picture of the location, frequency and amplitude of the vibrations.

STEPPED-UP ANNEALING—Effective use of insulating brick and high-temperature insulation is now enabling one foundry to process through six annealing furnaces the work previously handled by 12 units, it was learned recently from Johns-Manville, New York. Change in furnace construction, it is reported, also is showing a savings in fuel consumption. Annealing cycle of each furnace is cut to as low as 72 hours while firing time is reduced from about 80 to 40 hours.

HOT PRESS METHOD—In developing powder metallurgy techniques, the Germans worked along different lines from American metallurgists, especially in the manufacture of sintered carbide hard metals. According to the Office of Technical Services, Washington, they relied entirely on the hot press method which was used successfully in the production of cores for armor-piercing projectiles and in the development of tungsten-free cutting materials. The Germans, it is reported, surmounted difficulties usually associated with simultaneous application of great heat and pressure by using carefully weighted prepressed charges with a constant apparent density to control the final volume.

TRIMS COST—To increase production and reduce costs materially, one of the large electric motor builders is installing internal, upright stator grinders into its production line.

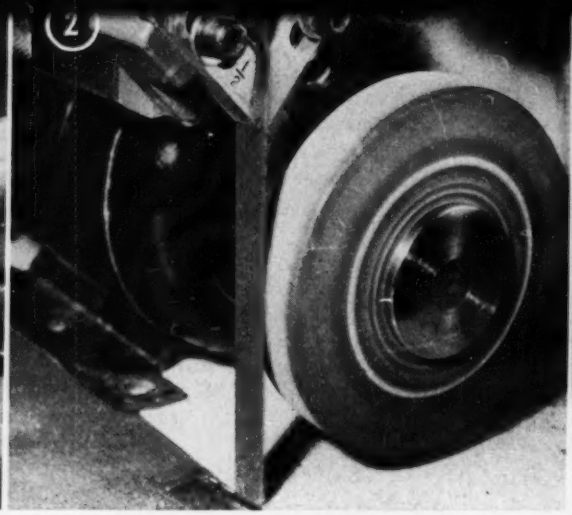
"MOLECULAR CRYSTAL GAZER"—In Camden, N. J., Radio Corp. of America reports the development of an electron diffraction camera capable of peering within the molecules of crystal structures to reveal the arrangement of their atoms. It is said to uncover details hitherto unobtainable, and when used with the electron microscope provides new avenues of research in science and industry. Already it is providing the best known method of studying submicroscopic surfaces of metals to uncover action of corrosion and rust contamination, permitting chemical analysis of substances weighing as little as 1/28 millionth of an ounce.

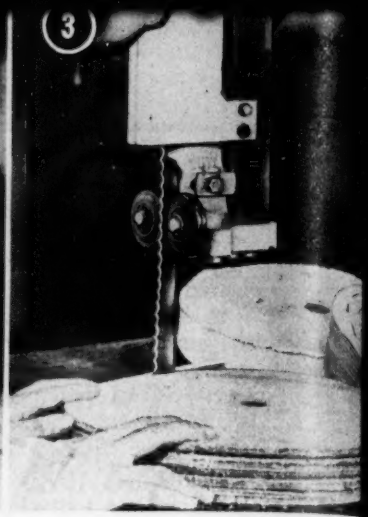
NO CHIPPING — Sawing of small curves in such materials as tungsten carbide is done at velocities varying from 2000 to 4000 feet per minute by using a diamond-tooth blade—one of the latest developments in band saws. Consisting of small rods, the teeth are processed from natural diamond particles—1/4-karat to each rod—bonded with a specially developed tungsten alloy to minimize loss of diamonds. Chipping, formerly a constant source of trouble in such cutting operations, is eliminated entirely by the blade. (p. 66).

LIFE UNPREDICTABLE — Both laboratory and mathematical methods of stress determination should be used to the fullest extent possible when making a clinical study of weldment design, it is pointed out by Gerald Von Stroh, assistant manager, development engineering, of Lukens Steel Co. Their use, however, should be tempered with a realization of their limitations. Experimental stress analysis of a gross structure provides stress levels, but it does not reveal how long the structure subjected to the reversals of stress will live at those levels. (p. 68)

TO IMPROVE TOOL STEELS — Absolute control of liquidation and solidification of steelmaking elements in Kellogg's recently perfected metallurgical process of continuous casting is expected to solve many high-temperature problems, bring about improvements in high speed steels and affect machinability of chromium-nickel stainless. In the process, an ingot of any desired size or analysis is produced by progressive solidification, alloying elements being fed at a controlled rate into an electrical apparatus directly to the mold from which air is excluded. (p. 74.)

"MASS" CHARGING — To charge large amounts of light scrap and pig iron required in cold metal shops, several companies are considering opening the entire front end of the furnace and charging, on a continuous grate chain charger, entire freight-car loads of scrap at one time. According to Charles R. FonDersmith, superintendent steel production at Armco, such a procedure in the past was only at a "dream" stage, and the subject of many discussions. (p. 85)





Band Saw

. . . now capable of cutting 200 basic materials and their derivatives

By H. J. CHAMBERLAND

ONLY a few years ago there was but little choice in saw band selection because, to be exact, there were only two types, the hardened tooth blade to cut metals as a whole and the wood-cutting spring tempered blade. Blading under ½-inch wide was only imaginary and so was contour sawing, practically speaking; both types as brand new saws would immediately collapse as the teeth came in contact with some unseen abnormal physical condition.

Today the sky is the limit for band sawing. Be it asbestos, alibaster, alpaca or zinc, zircon, zebrawood and what have you, there is a band saw blade to "tailor" the material whether it is soft, hard, abrasive, spongy, springy or slippery.

Of course industry still makes excellent general use of both types of blading but on a much larger scale, due primarily to improved steel alloys used to make them. This is quite true of the hardened tooth type of saw because of additional properties such as absolute control over the cutting and setting of teeth, scientific heat treating, plus the fact that it incurs no maintenance cost.

Previous to 1935, there were few materials seriously regarded as band sawing applications. By 1940 there were at least 50, but six years later some 200 basic materials plus their derivatives were being economically band sawed. Largely responsible for this marked step-up were the two following factors:

First, a new saw of unique tooth construction proved to be far more effective than the regular hardened tooth band for cutting nonferrous metals and more economical than the spring tempered band for cutting thicker and harder wood sections. Both original types of bands thus benefited because these inventories could be substantially extended while tremendously increasing the general field of applications. Second, during this course of events, it was also discovered that the standard pitch or original hardened tooth blade as now heat treated was the missing link for a brisk revival of the almost forgotten friction cutting process now receiving so much recognition.

It can now be said, "the material that cannot be band sawed is yet to be developed." The law of sound reasoning must of course be applied. We cannot friction saw a 10-inch thickness of 90 rockwell hardness, but on the other hand there is a saw that will so cut ¾-inch steel that hard at the rate of 14 lineal inches per minute, another that can easily resist tungsten carbide, another that will revolutionize the cutting of all textiles and still another that will cut out a die from a 0.040-inch starting hole while providing a 360-degree cutting edge.

Types of Saw Blading—There is at present an assortment of some 12 types of band saw blading suitable for all industrial requirements; however, some are almost identical in design and cover closely related groups of applications so the complete line really boils down to six distinct high speed types and the process of elimination will therefore simplify their brief description.

Most recent band saw development is the diamond-tooth blade shown in Fig. 5. The band proper is ½-inch wide and is of a special spring alloy steel with gullets designed for most rapid removal of material from the saw kerf. Teeth consist of small rods, 1/16-inch in diameter and ⅜-inch long, processed from natural diamond particles of which there are ¼-karat to each rod, bonded with a specially-developed tungsten alloy to minimize loss of diamonds. The matrix wears down surprisingly slowly even when regularly cutting tungsten carbide or glass of substantial thickness.

This blade is specially intended to cut the general run of ceramics, glass, marble, granite, ore, porcelain, china, slate and materials of high carbide silicon contents. Width and design of blade permits sawing reasonably small curves and a marked advantage when sawing glass. Velocities vary from 2000 to 4000 feet per minute all depending on nature of material

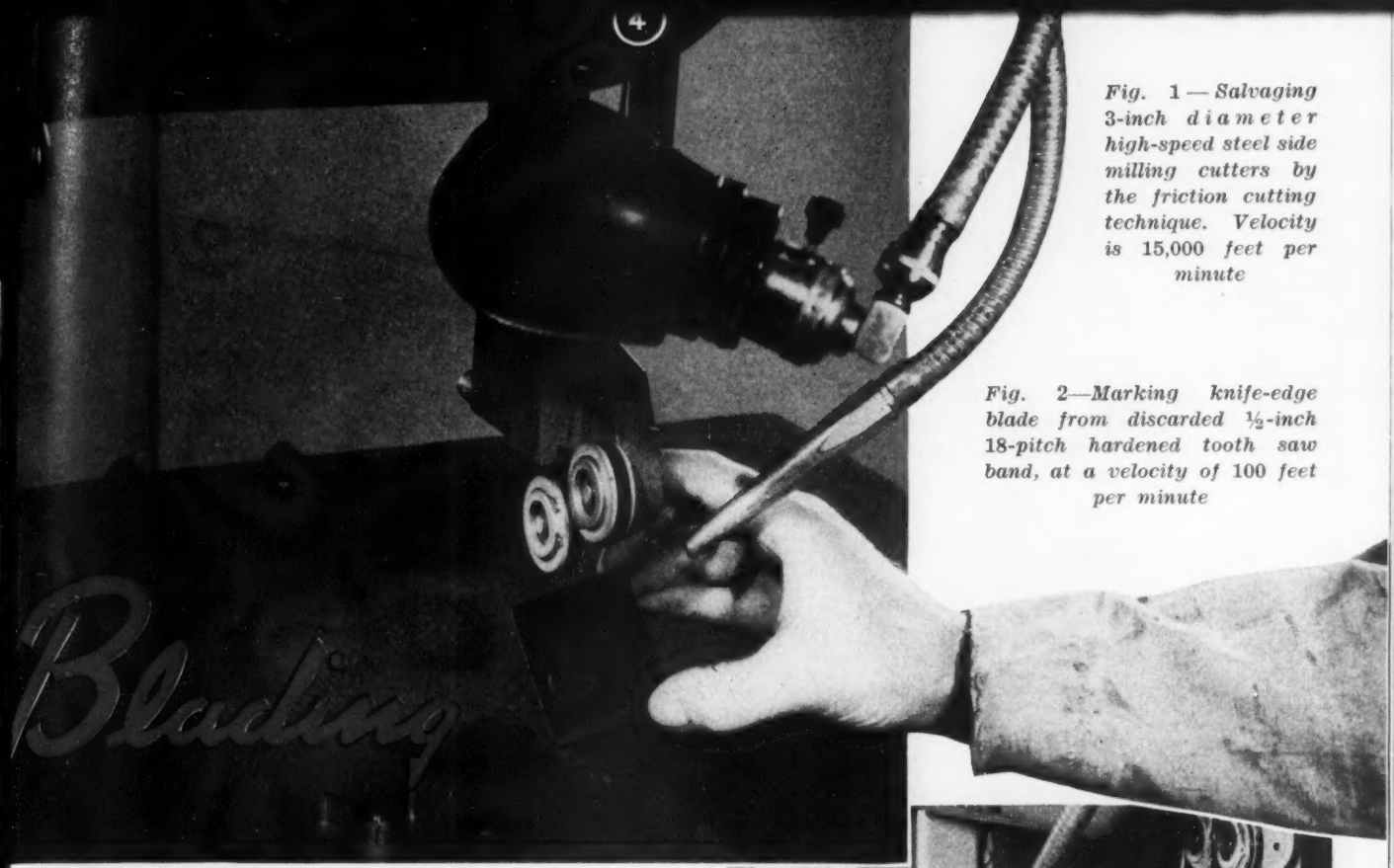


Fig. 1 — Salvaging 3-inch diameter high-speed steel side milling cutters by the friction cutting technique. Velocity is 15,000 feet per minute

Fig. 2—Marking knife-edge blade from discarded ½-inch 18-pitch hardened tooth saw band, at a velocity of 100 feet per minute

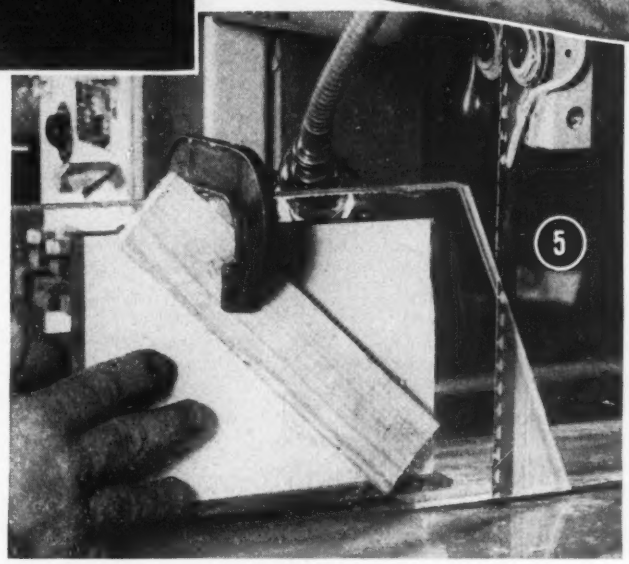


Fig. 3—Made of the finest grade of tempered Swedish steel, this improved type of scallop-edge band saw blade is shown here trimming buffing wheel at velocity of 4000 feet per minute

Fig. 4—Part of ¾-inch tool steel die cut with spiral type band saw 0.040-inch in diameter. Velocity: 150 feet per minute

Fig. 5—Matrix of this diamond-tooth saw blade wears down slowly upon cutting tungsten carbide or glass. Here it is shown penetrating 12-inch thick plate glass. Velocity: 2000 feet per minuate

and its thickness, in most cases thickness is limited only by machine height capacity.

It is very important that a coolant be used. The spray type is most effective and recommended for maximum saw life and cutting rate. Water is satisfactory for most materials; tungsten carbide, glass and like should, however, be cut with kerosene or synthetic turpentine. Chipping, a constant source of trouble with any saw band previously used, can be entirely eliminated with this new diamond blade.

Spiral Blade—Another band sawing practice innovation is the spiral blade, Fig. 4. Although this saw requires special guides, its many unique applications will amply compensate for the negligible investment. Made in two diameters, 0.040 and 0.074-inch, with a choice of hardened teeth or spring tempered, this "endless rat tail-like" saw will execute work never before possible with any other type of blading.

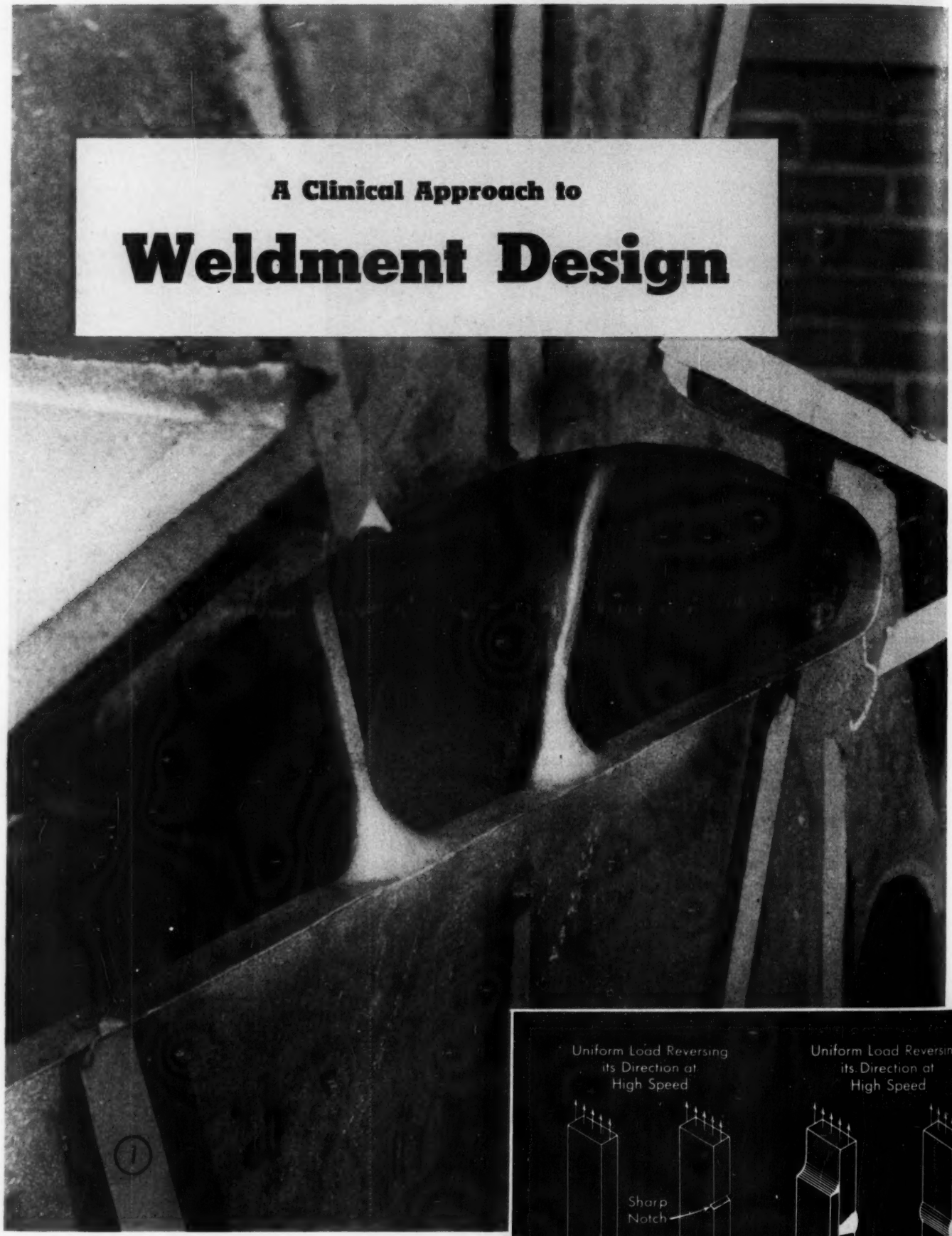
Primarily, the saw cuts in all directions without turning the work around and yet it can be revolved 360 degrees by using the same size holes as the saws as pivoting points. The 0.040-inch diameter saw will cut a kerf approximately 0.025-inch narrower than the regular type band and will leave but a 0.020-inch radius at intersections. Larger diameter saw should of course be given the preference on thicker materials for increased work feed pressure and maximum perpendicular accuracy of cut.

This type of blading is extensively used for short-run production intricate cuts on all materials within the range of the conventional saw band, lettering and scroll work on brass, copper, aluminum, plastics and wood are most frequent applications. The saw is adapted to both the conventional and high velocity range, it is indeed a combination saw and file because it will produce an exceptionally fine finish on all materials.

Scallop-Edge—The scallop-edge band saw blade, Fig. 3 is also receiving its share of recognition at this time. Made of the finest grade of tempered steel, this "separating" band (*Please turn to Page* 104)

A Clinical Approach to

Weldment Design



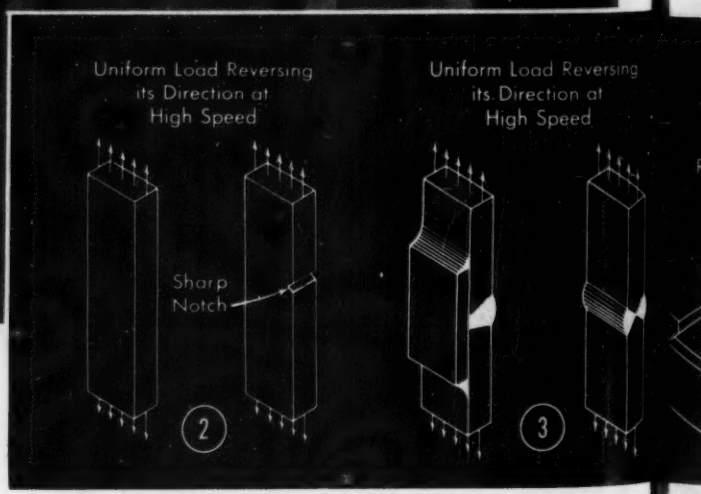


Fig. 1—End plate from a diesel electric engine frame, in which distress shown in its secondary joints was eliminated by fairing with weld metal

By GERALD VON STROH
Assistant Manager, Development Engineering
Lukens Steel Co.
Coatesville, Pa.

Need for a thorough diagnosis of the behavior of welded structures is the result of a combination of features such as the frequently overlooked fundamental that a weldment is one piece of metal. It may have internal notches and incipient cracks designed into it

CLINICAL approach to the design of weldments is a study of the behavior of welded structures, particularly failures of welded structures, during and after their service life, much in the same manner that a physician approaches a human ailment and learns from it.

Need for such an approach is the result of a combination of features peculiar to weldments, such as the frequently overlooked fundamental that a welded structure is one piece of metal and that for economical reasons one piece of metal may have designed into it internal and/or external notches and incipient cracks. Such notches and cracks, as will be discussed later, may drastically affect the endurance limit of the welded structure.

A clinical study of weldment design should utilize laboratory and mathematical methods of stress determination to the fullest extent possible. However, their use should be tempered with a realization of their limitations. Experimental stress analysis of a gross structure will give stress levels, but it will not tell how long the structure subjected to the reversals of stress will live at those levels.

There are no systems of mathematics which will determine the fatigue value of a gross structure. Usually we will take the known static loads, apply a factor of safety or of "ignorance" and trust all will be well. Full-size fatigue testing of a gross structure will essentially give us the required data, but unfortunately full-scale fatigue testing is usually too expensive and the structures too large to make this a practical method for many applications of welding.

Practical Course—It would appear, therefore, that the practical course is to use conventional methods for proportioning the members of a structure and by clinical study of service behavior develop a qualitative feeling for what is good practice to permit the gross structure to function in a predictable manner.

As a first step to a clinical study of weld failures, and in view of the fact that a weldment is one piece of metal, consideration should be given first to the characteristics of one piece of steel under dynamically loaded conditions.

Fig. 2 (left) shows ordinary well-made structural steel with a yield point between 30,000 and 40,000 pounds per square inch. If a load is applied to it and reversed—parallel to the length of the bar and uniformly over its cross section—its endurance limit will be approximately one-half its ultimate strength.

If bar is notched, as shown in Fig. 2 (right), endurance limit, expressed in pounds per square inch, will be considerably reduced. A profound fact (involving the constantly increasing use of high strength steels in weldments) recognized by the more "scientific" researchers but often blandly ignored by so-called "practical" designers should be emphasized at this point.

Conventional fatigue specimens are made carefully to avoid stress concentration at the critical section. The endurance limit obtained from conventional specimens increases approximately in proportion to the tensile strength. In other words, if a high strength steel is used, its endurance limit under ideal conditions is proportionately increased.

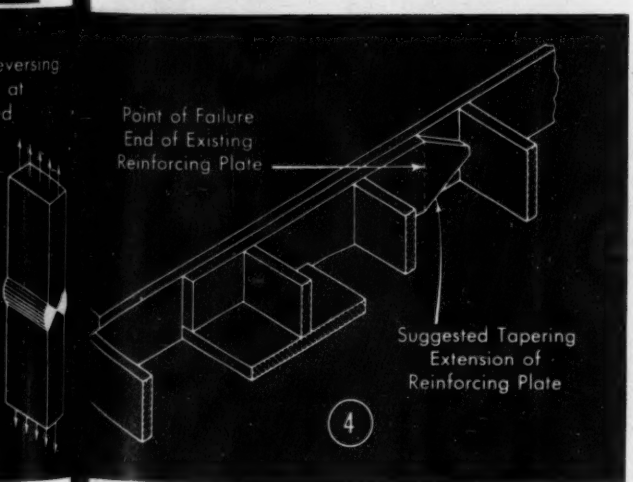
However, if a sharp notch is introduced, as in Fig. 2 (right), fatigue strength is about same for high and low strength materials. This indicates that there is little value in using the more expensive high strength steels in a dynamically loaded structure wherein notches exist. Despite this, there are many dynamically loaded structures in service today involving the use of high strength steels with innumerable stress raisers of this nature in them. Frequently, it seems, high strength materials have been used in a very unintelligent manner.

Weldments are still being designed with variations of conditions shown in Fig. 3 (left). Here, the judicious use of such conditions is entirely proper. However, the designer must, of necessity, have a nice feel-

Fig. 2—(left) If load is applied to steel bar and reversed parallel to length of bar and uniformly over its cross-section, its endurance limit will be about one-half its ultimate strength. (Right) If bar is notched, as shown, its endurance limit will be considerably reduced

Fig. 3—(left) Weldments are being designed in this manner despite failures. (Right) Welded joint with reinforcements. Most specifications now limit such reinforcements to thicknesses of ⅛-inch

Fig. 4—Internal view of construction which shows one method of eliminating severe "notch effect"



ing when and where such construction might be used without distress.

At one time, welded joints were specified with so-called reinforcements, shown in Fig. 3 (right). However, most specifications now limit such "reinforcements" to ⅛-inch thicknesses. Why a weld of the type shown here is specified is an unanswered question. Perhaps the idea is to provide more metal, on the chance that the joint would not be so good as expected, for one reason or another.

Stresses Like Fluid — Why such conditions, as shown here, will have an effect upon the fatigue strength of a piece of steel might be considered briefly. If this piece of steel were considered as a pipe with fluid running through it under high pressure, it would be seen readily where turbulence would occur. To a certain degree, stress, while it is an intangible, flows through a piece of steel and a gross structure much in the manner that fluid flows through a pipe and pipe system. Wherever turbulence would occur, if the structure were a system of pipes, an interruption in the flow of stress would occur and cause a stress concentration. If a designer will carry this simple analogy in his mind when designing a welded structure and bear in mind the fact that a weldment is one piece of metal, he probably will design a more predictable weldment.

Fig. 6 shows a structure in which failure occurred at a design detail similar to that just described. It is obvious that the designer could not predict the occurrance of failure in this car frame, otherwise it would not have occurred. Depending on the usual flexure formulas, estimating loads imposed, and applying the factor of safety, the designer disposed his material.

Two design uncertainties of vast proportion existed in this structure. First, the stress augment due to impact could only be guessed. Such unpredictable impact forces are two-fold in such a structure. The designer cannot control definitely the maximum load or the ease with which it is applied. Loading of slabs or ingots can affect peak stress levels tremendously with the impact varying considerably.

Second, the superimposed stresses due to impact while the car is in motion, likewise, could only be surmised. Such stress augment varies, of course, with speed, track conditions and general handling, such as coupling. These unpredictable factors naturally suggest the use of experimental stress analysis so that

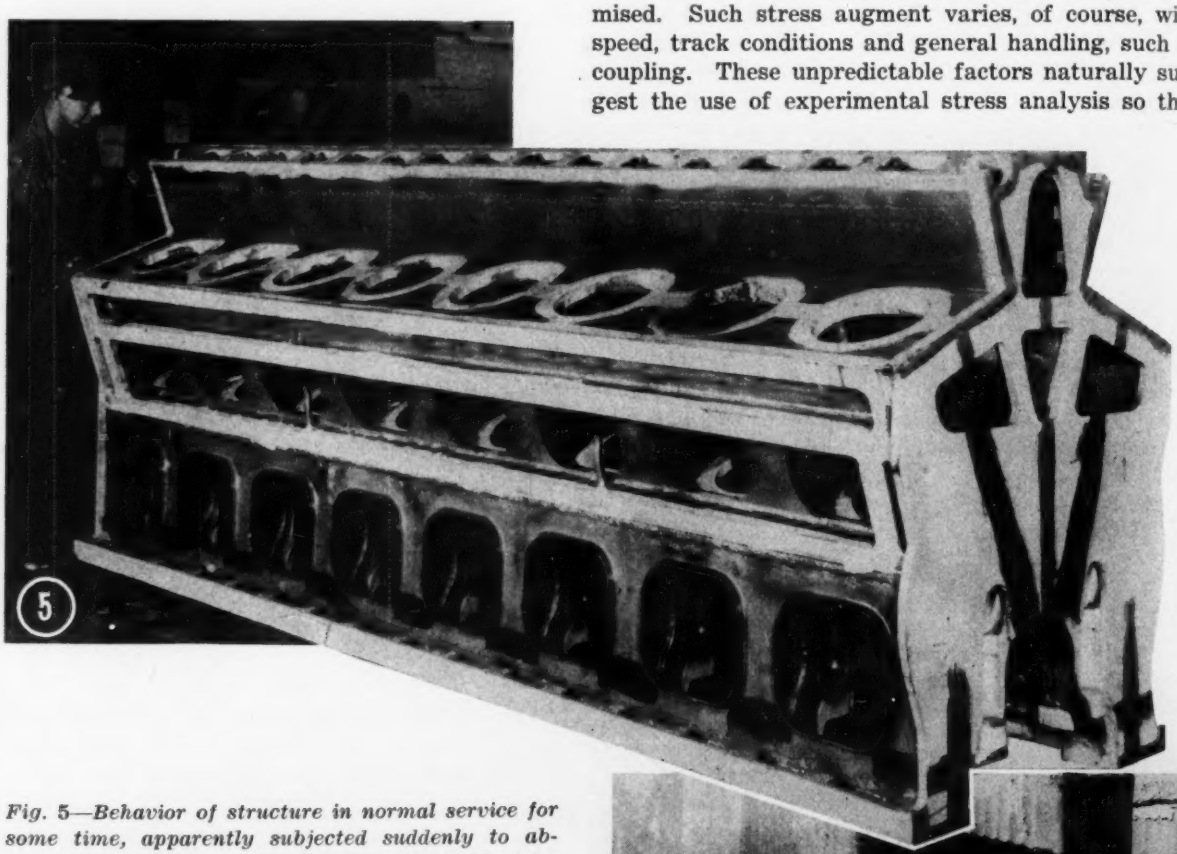
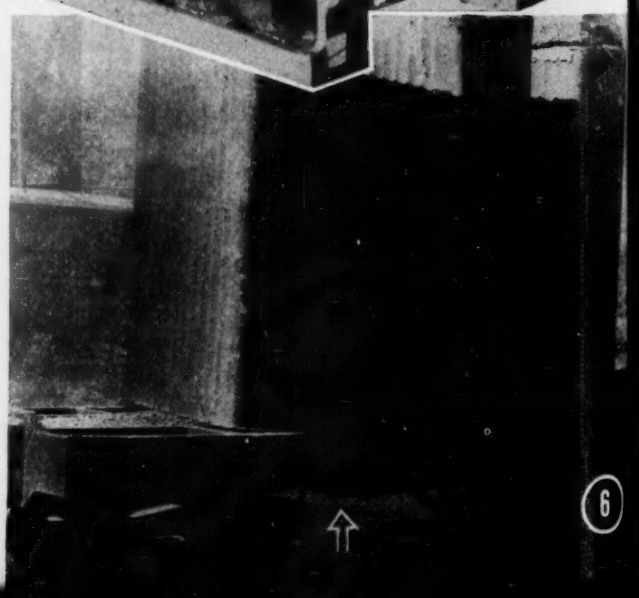


Fig. 5—Behavior of structure in normal service for some time, apparently subjected suddenly to abnormal forces. Frame of a diesel engine of the type used for the propulsion units of a submarine

Fig. 6—Car frame, loaded with steel ingots. Arrow points to location of eventual failure

Fig. 7—Surface of fracture in a weld joining a secondary member to upper portion of the engine

Fig. 8—Fracture in fillet weld which apparently originated from slag inclusions in the interior of the weld



operating stresses on pilot models can be determined definitely.

Notch Sensitivity—Notch sensitivity at the point of fracture is another important design uncertainty. This point was in the side member of the car in this illustration below the left and center ingots. The fracture occurred at the end of an inner reinforcing member that cannot be seen in the illustration. While such a notch effect externally is large it is still a notch. An abrupt discontinuity of metal occurs at the point of fracture.

The designer did have a measure of control here if he possessed a proper feeling for elastic and plastic actions of steel plate. He could have eased the contour at the change in metal sections by making it gradual, and this would have permitted a smooth flow of stress. Fig. 4 shows an internal view of the construction, which pictures one method of achieving a gradual change in metal section. This is only one of the methods that can be used to achieve the same end.

It is simply a tapering extension on the reinforcing member which provides a gradual change in the rigidity of the structure at this point, thus eliminating the severe "notch effect". The designer's knowledge or feeling in proportioning such an "easement" is, however, purely qualitative. He had no quantitative values or methods dictating the proportioning of this gradual change in section. Some may believe that such detail can be determined mathematically but proof of any such methods applied under dynamic conditions remains to be seen.

Considering the number of unknown factors in this instance, "speculative designing" certainly existed. Without experimental analysis or without good luck, hundreds of such structures could have been put in use before weak spots were discovered. All this, of course, is one reason for the emergence of "experimental stress analysis" as an organized function of engineering.

Nothing can eliminate the possibility of failures of this type except redesign. The weak spot could be avoided simply by setting the bottom plates between the primary members. This would eliminate the notching of primary side members

Many engineers are prone to this kind of designing. Many times, probably more often than not, they "get away" with it. But, here is physical evidence of at least one instance wherein it didn't work. Hence, it is a fair conclusion that when failure does not occur at such a point, two things are true: Dynamic loading to an appreciable degree does not exist, or if it does, the structure has not been in service long enough to show distress, a dangerous situation economically; or, the structure is over-designed.

The "one-horse shay" is still a good goal in engineering, particularly in these days of drastic necessity for minimum weight in many structures.

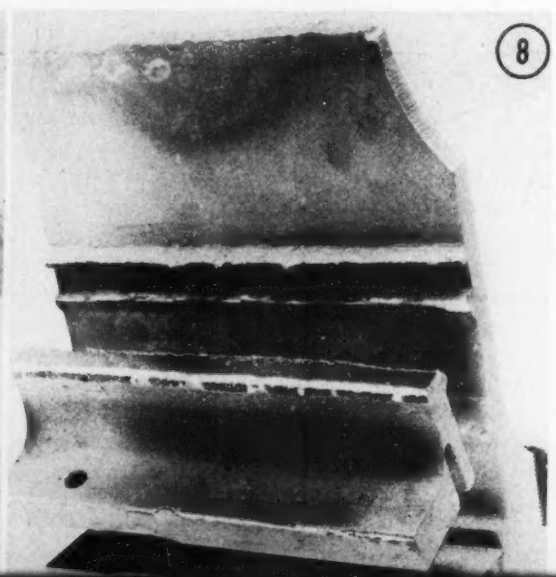
Secondary Member Distress—A mystifying type of failure is that in which a purely secondary member, or its joints, shows distress. The end plate on the engine frame shown in Fig. 1 is in this category. This member is simply a closure plate sealing off certain parts of the mechanism and providing support for auxiliary units. This plate is machined over its entire surface and is drilled and tapped in many places for the support of the blower housing. The central opening is provided to admit air. In its design a maximum size of opening was desirable.

Fig. 1 shows the construction of the frame in the region of this opening. The two slanting inner members carry a primary load to resist the tendency of the firing load to increase the distance between the cylinder head and the main bearings. Thousands of these engine frames were manufactured during a period of several years.

But, in one instance, distress appeared in the fillet weld connecting the end plate with the primary member, at the bottom of the elongated opening. This short fillet weld fractured.

When a failure of this nature happens, with thousands of similar units in service, two worrisome questions naturally occur to the designer: First, can it be an epidemic is started that will culminate in failure of every unit at this point? In other words, is it a fundamental design weakness? Or second, did the unit on which distress first appeared undergo abnormal service conditions?

In the instance cited, failure finally evidenced itself on several frames. And, insofar as could be determined, the frames showed no distress at any other location. If the failure were confined to one or two frames, the conclusion might be drawn that the welding was below average standard. There were, however, a sufficient number of frames involved here to permit the assumption that the average of quality



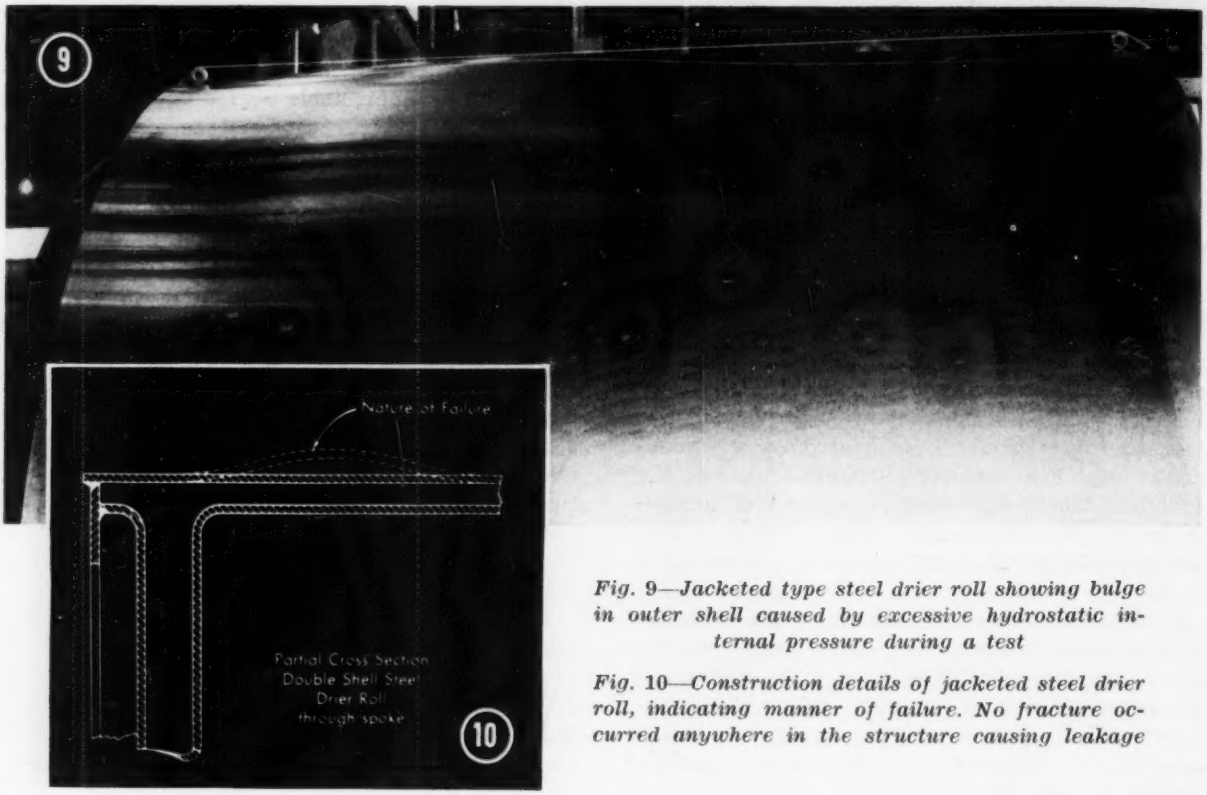


Fig. 9—Jacketed type steel drier roll showing bulge in outer shell caused by excessive hydrostatic internal pressure during a test

Fig. 10—Construction details of jacketed steel drier roll, indicating manner of failure. No fracture occurred anywhere in the structure causing leakage

was involved. These frames were varied in their ages —they were not all produced in one batch that might have been made under similar conditions.

Superficially, this failure might seem of a minor nature. It is to be noted, however, that once the fillet weld in question develops a crack in its surface, a severe notch exists in the edge of a primary member.

"Easement" Created—The frames involved were repaired in the manner shown in Fig. 7. The defective weld was removed completely and a gradual "easement" or "fairing" was created by weld metal as shown. Here again the correction is based on the elimination of abrupt changes in metal section, or of the abrupt change in stiffness of the structure at this point. The ability of the structure to absorb energy without distress was changed in this region.

All this occurred some 2 years ago; no report of further failure has been heard. Nor had the failure spread to others of many hundreds of such engine frames in service. Why a failure occurred in the few isolated cases remains unanswered.

That abnormal service conditions existed is a logical assumption. In spite of lack of fundamental knowledge here, the discussion serves one purpose. It shows that unexpected failures do occur at points that defy mathematical analysis. At these points in the design reliance must still be placed on qualitative evaluation of the elastic behaviors of steel shapes.

Abnormal Conditions—Fig. 5 shows another type of failure that might be considered, involving abnormal conditions. It pictures the behavior of a structure in normal service for a considerable period but apparently suddenly subjected to abnormal forces. An engine with a frame similar to that shown here was put in service several years ago. Since the engine was operated for about 10,000 hours as one of the propulsion units of a submarine, it would seem reasonably safe to conclude the design had proved entirely adequate. In addition, innumerable other frames of this type were in similar service. During World War II, however, the submarine was depth-charged many times, on one occasion so violently that she was blown to the surface. Sometime following these experiences fractures were discovered in the engine frame.

Subsequently, this failure was investigated thoroughly, as the result of which 126 cracks were found throughout the frame structure. Many of these fractures started at stress raisers such as machined contours. Others started at the edges of openings. Many cracks originated in the welds connecting secondary members in the structure. But, none of the fractures occurred in either the welds or in the parent metal of primary members.

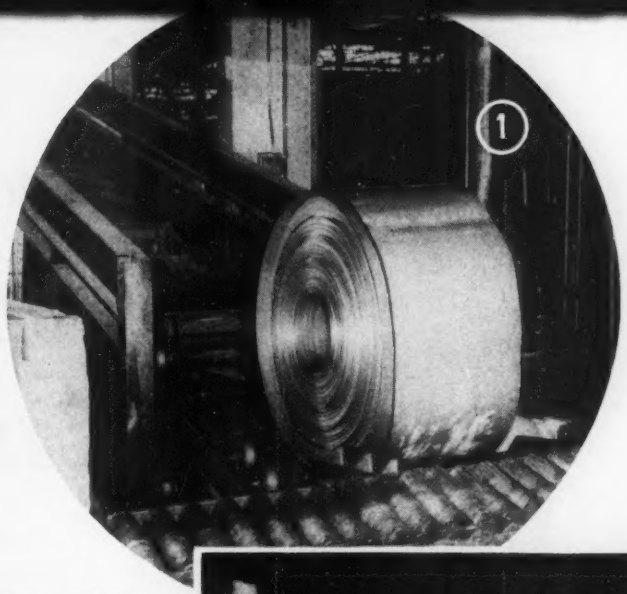
Fig. 7 shows the surface of a fracture in a weld joining a secondary member to the upper portion of the engine. It is apparent that this fracture originated in the interior of the weld, starting from an unfused area and progressing outward toward the surface. The unfused area at which the crack started provided, of course, an interal notch effect.

Fig. 8 shows a fracture occurring in a fillet weld connecting a machined supporting rail to the side of the frame. This crack has certain peculiarities. First, it originated on the surface in the center of the weld, which would seem to indicate that the force initiating the fracture was simply of such magnitude that the fillet wasn't heavy enough.

Hence, failure occurred (*Please turn to Page* 106)

Overhead Coil Conveyor

. . . saves space for other mill operations at Weirton Steel

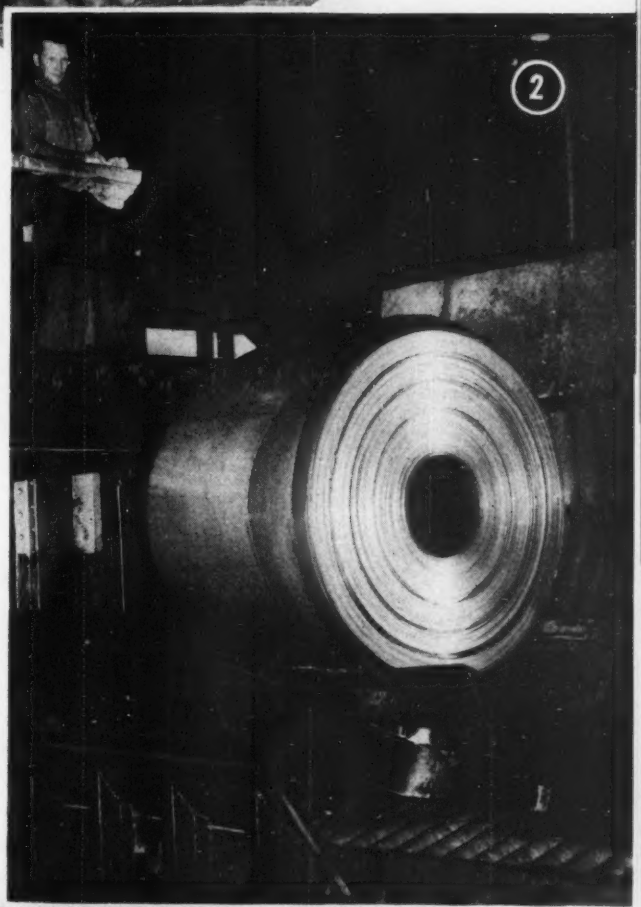


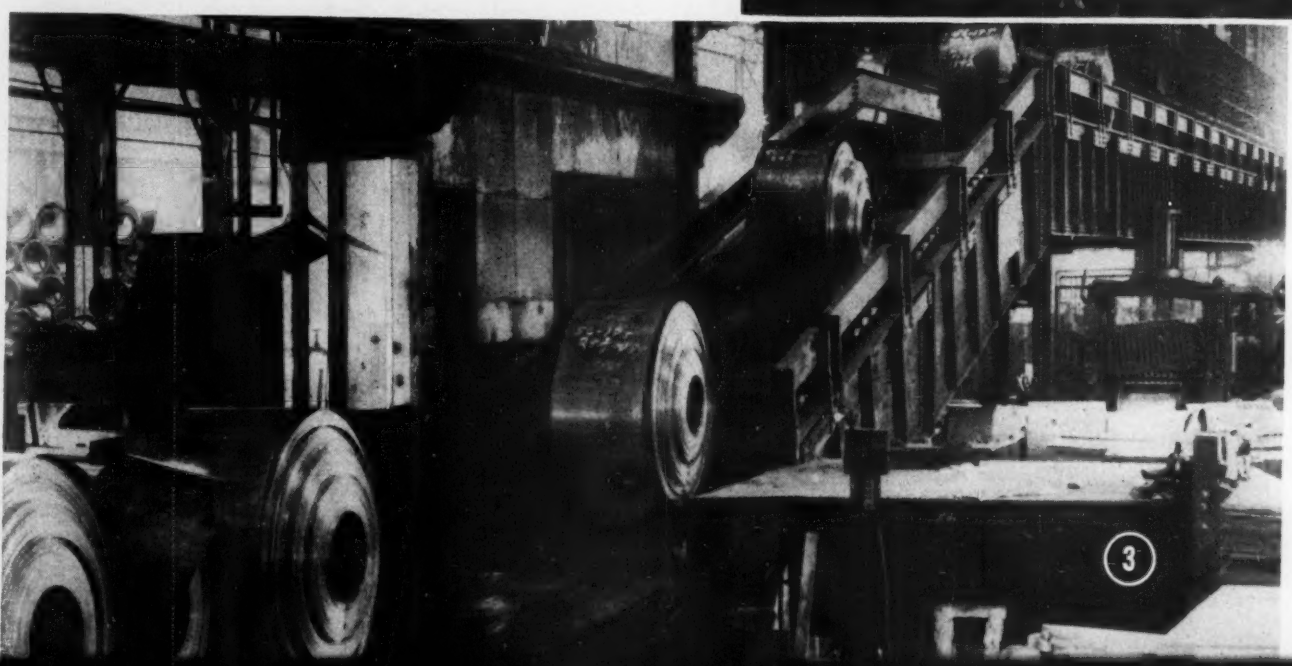
NEW 600-foot overhead coil conveyor in the tandem building of the 48-inch strip steel department of Weirton Steel Co., Weirton, W. Va., is a considerable space saver, as can be seen in the accompanying photographs. Beginning and end of the hot rolled steel pickling process are shown in Fig. 3. At extreme left background, hot mill coils not yet pickled are seen piled high in storage.

Glare of the automatic welder at the far right means that two coils are being welded together. At extreme right under the conveyor proper is the barrel stock line where sheets for the manufacture of steel barrels are processed. Stacks of these sheets appear in the right foreground. At the end of the conveyor is the motor drive that pulls the four-wheeled cars, conveying coils from discharge end of pickler to the No. 6 cold reduction mill.

Fig. 1 shows a coil of hot strip coming off the 60-inch pickler. It is lowered by the turndown onto the roller conveyor for a short trip to the charging end of the new overhead conveyor from which it will move to the No. 6 tandem mill for reducing to tinplate thickness.

An air cylinder kickoff, Fig. 2, starts coil up charging end of overhead conveyor, headed for No. 6 tandem. Each coil has its own individual car. Coils earmarked for No. 4 tandem continue on roller conveyor to left where they are automatically kicked off onto loading ramp. Coils coming off overhead conveyor are removed by crane and carried from conveyor ramp to the palette conveyor at entering end of No. 6 cold reduction mill.





Electric Ingot Method for Continuous Casting Alloys

Absolute control of liquidation and solidification of steelmaking elements in Kellogg's recently perfected metallurgical process expected to solve many high temperature problems. Improvements in high speed tool steels and machinability of chromium-nickel stainless among other advantages cited. Melting speed of single-ingot machine about 7½ pounds per minute

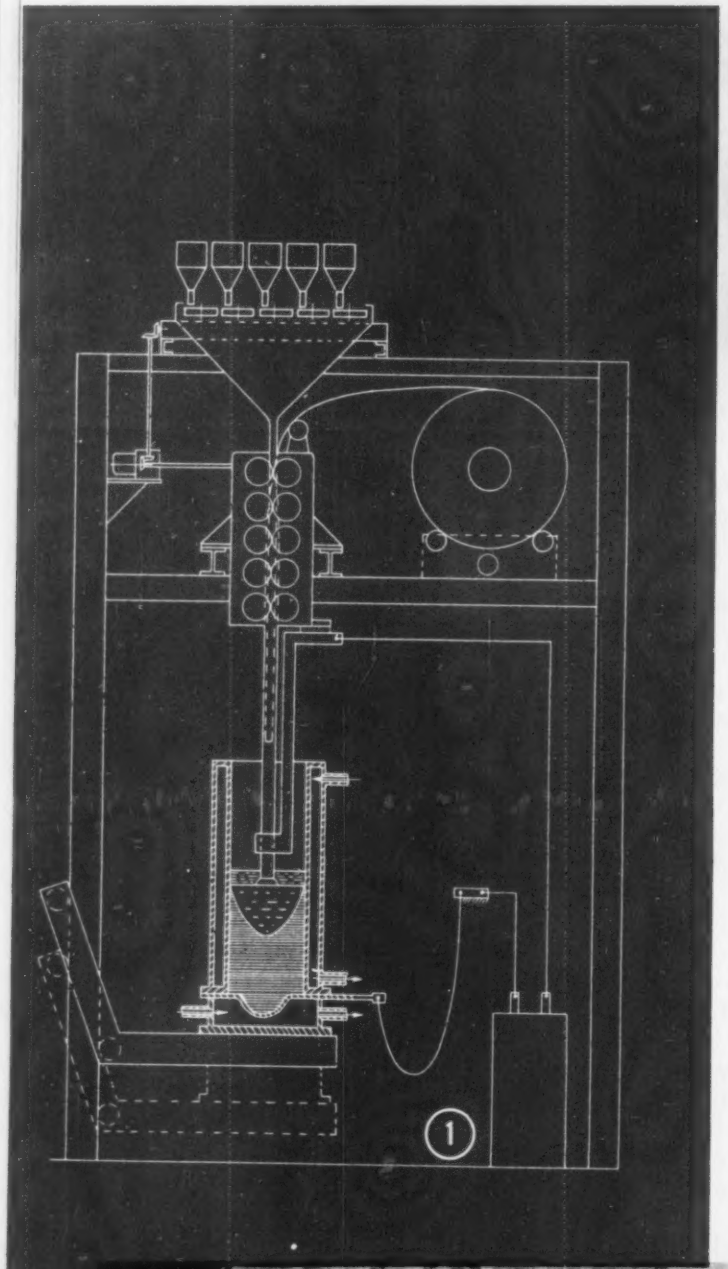
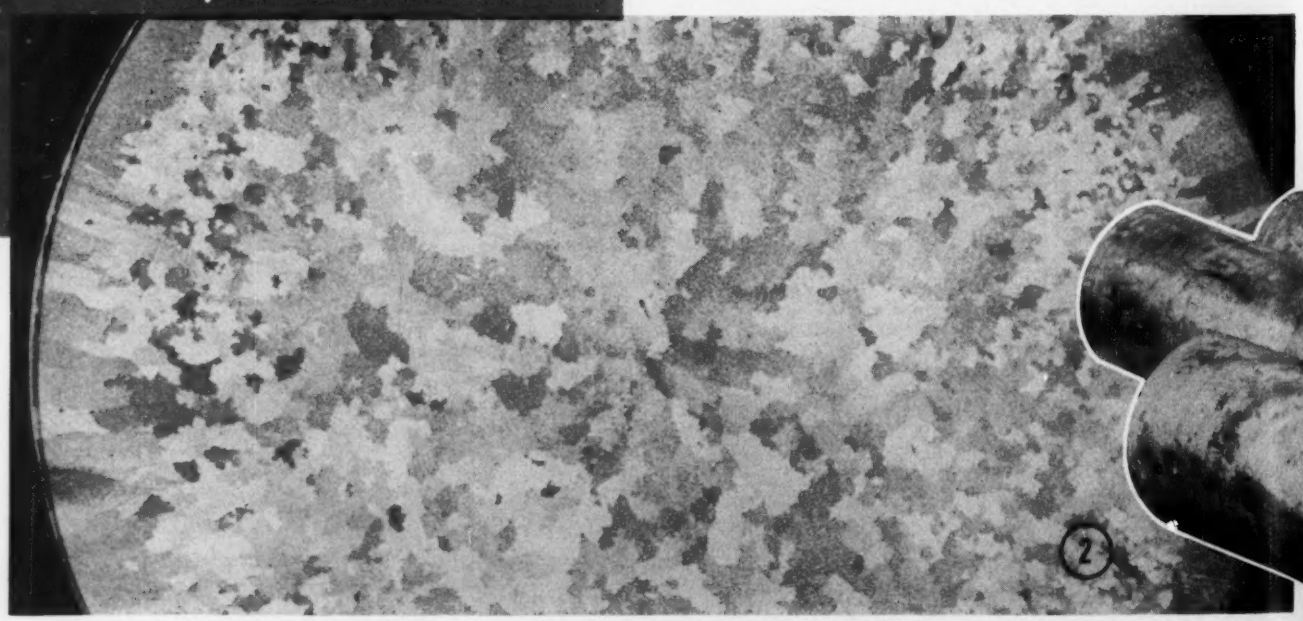


Fig. 1—Drawing showing how steel and alloying elements are combined in the process. Metering device for alloy material is at top along with hoppers. Strip coil, upper right, is formed into a tubular electrode

Fig. 2—Macrograph of a cut from top end of cast high temperature alloy billet

Fig. 3—Small shipment of cast billets made by new process. These are each 9 inches diameter and 21 inches long, of special high temperature alloy for production of gas turbine rotors



TWIN-baffling problems in previous experiments and research in continuous casting—control of liquidation and solidification of steelmaking elements—is absolute in a new process for continuous metal casting on a commercial basis.

After 12 years of research, M. W. Kellogg Co., Jersey City, N. J., fabricators and users of steel, is in capacity production of specialized alloy steels using the important metallurgical developments — one that marks a basic advance in steelmaking practice, with possible further revolutionary possibilities.

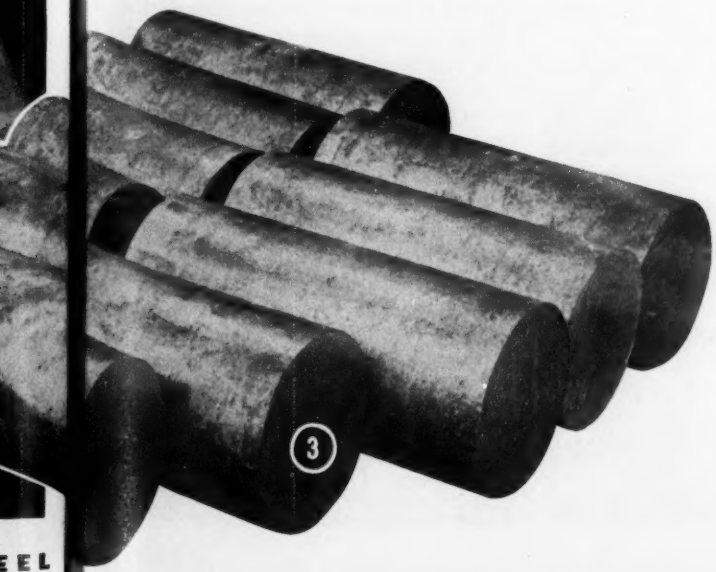
There is no transfer of hot metal from furnace to ladle or iron from ladle to mold in the Kellogg process and quality and uniformity to product is controlled to a remarkable degree. Yet, like many new basic developments, this process, once the answer is revealed, appears relatively simple. Technically it is an electric ingot or billet method of continuous casting and a long step in the direction of mechanical steelmaking. An ingot of any desired size or analysis is produced by progressive solidification, alloying elements being fed at a controlled rate into an electrical apparatus and direct to the mold from which air is excluded.

Although research on this process began when need for superior high temperature alloys became apparent, the Kellogg method had developed sufficiently during the war to permit production of hundreds of tons for high-speed tool steels and a substantial volume of stainless, much of which went into welding rods.

Progressive steps by which steel and alloying elements are melted and solidified are shown in the drawing, Fig. 1. Alloy metering devices or hoppers at the top are synchronized with and operated by the same motor powering a tube forming unit. The tube is formed from cold-rolled strip and becomes a consumable electrode which is melted or liquefied in the mold by a high current electric arc under a top blanket of slag which rises as the ingot and bath builds up.

Inside the tube electrode a small inner tube conducts metered alloying elements to the arc where they are liquefied instantly and distributed evenly in the bath with the liquefied section of the tube electrode. All electric melting is done under the slag and

By L. E. BROWNE
Associate Editor, STEEL



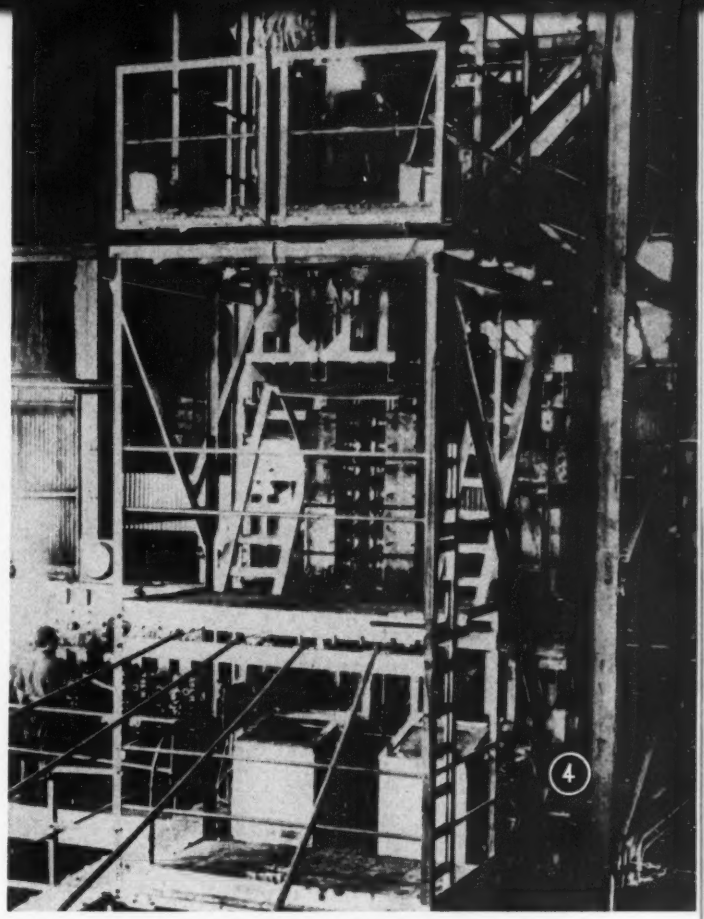


Fig. 4—General view of machine for producing special alloys

clear of the machine proper. No scrap or pig iron is used.

Ingot or billet is produced in a copper shell water-cooled mold at the bottom where the process begins with a starting mix of the elements to be melted. This is liquefied by the electric arc, completely submerged under the slag blanket, a condition prevailing throughout the melting process. As the bath rises, as the lower section solidifies, the slag blanket also rises and builds a thin wall of slag on the inside of the mold, thus no air contacts the melt in liquid or solid state.

Solidification of the ingot starts at the bottom and outside walls of the mold first and, as it builds up, a liquid bath is maintained in the center of the ingot around the arc under the slag blanket. To finish or level the ingot top, the mold is transferred on a carriage to a nonconsumable electrode station when the ingot is electrically hot-topped. As the ingot grows, the mold is pulled down, permitting fixed position of the arc, melting center and alloy distributing inner tube.

Operating temperatures are around 3500° F and melting speed, for a single head or ingot producing machine, is about 7½-pounds per minute. An electrical arc is the melting unit and while operating temperatures are normally around 3500° F, adaptations of the equipment and machine make possible much higher temperatures.

Not only are production and quality controls maintained with this process to minute degree but flexibility of the equipment is noteworthy. Several usual preparatory operations before rolling are eliminated,

TURBINE CASING GRINDING: Fabricated from all welded plate steel, this model of a hydraulic turbine spiral casing is being dressed by a portable grinder. Built for model turbine testing purposes in the hydraulic laboratory of Allis-Chalmers Mfg. Co., Milwaukee, its general design simulates that of some larger hydraulic turbines of either all-welded or riveted construction. These casings surround and distribute water to main turbine parts which fit into the central circular space

conventional hot-topping and conditioning to mention but two of these operations.

No refractory material except slag is employed, the billet being produced in a water-cooled mold. The shell of slag rising with the solidifying billet in the mold results in no contact between the mold wall and ingot metal. Alloying elements are crushed to a free-flowing particle size. The consumable tube electrode melts off faster than the flow of alloys through the inner tube, this eliminating possible clogging, the alloys being liquefied by the same arc melting the tube, both below the machine and under slag blanket.

Depending on the steel specification sought, strip from which the tube is formed may be of varied analysis. Ingots now being produced are normally 6 feet long by 11 inches maximum or 4 inches minimum, but size is flexible. In the finishing off operation, the super-heated bath in the top of the ingot is similar to the physical condition of metal in a conventional mold, the nonconsumable electrode giving off heat only for hot-topping the ingot evenly.

A self stress-relieving condition prevails in the production of an ingot or billet by this process. Solidifying area is held at high temperature for a long period by the molten bath above, thus any internal stresses are relieved. There is no chemical mixtures used in this continuous casting process, and ingot growth takes place in a solid skin of slag, contributing to uniformity of the structure lengthwise and from side to side. Lead bearing stainless steel is produced with no sign of segregation, distribution of lead being uniform throughout the structure.

In addition to elimination of conventional hot-topping, conditioning and excessive cropping, ingots can be made to any specified length to fit a furnace and other size requirements. Every pound of material melted is utilized and, once in operation, the arc is melting 95 per cent of the time, with strip coils welded for uninterrupted tube forming. There is no translation from an experimental heat to a production heat since, what in effect is an experimental heat is actually a production heat.

Flexibility of the process and equipment is indicated by possible changes in production specifications as wide as tool steel and stainless with alternate ingots; indeed, the same ingot can be made of steel of two different specifications. Also there are no off heats with this rigid control of raw materials, and the influence of weather or oxygen is no factor as the melting arc is completely submerged. This process is, therefore, practically a mechanical method of steel-making.

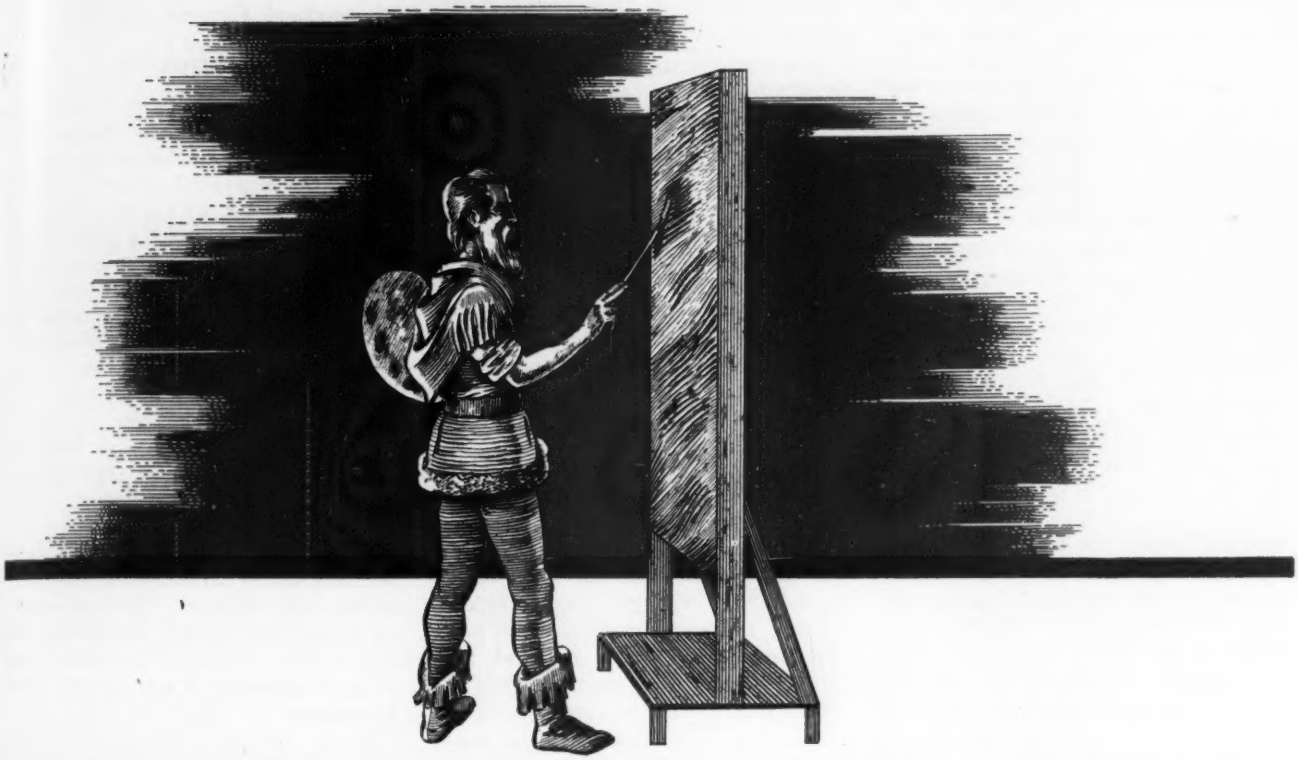
Higher Cost Not Apparent

The cost is currently higher than in conventional steelmaking practice, but when quality control of highly specialized alloys is assured with elimination of other usual steelmaking steps and no rejects, this higher cost is not so apparent. Carbon steel can be produced by the process, but cost differential in those grades would be substantial.

Accuracy with which alloying elements are metered, combined with the fact that the ingot is progressively solidified in the same container in which all raw materials are melted, provides not only uniformity of chemical analysis but also uniformity of physical properties. This uniformity is obtained not only within an individual ingot but also is carried over from ingot to ingot. The finished alloy ingot is substantially free of the defects observed in some produced by usual methods of alloy manufacture. Highly segregated areas in the center of ingots, internal bursts, segregated carbides, and "piping" are eliminated.

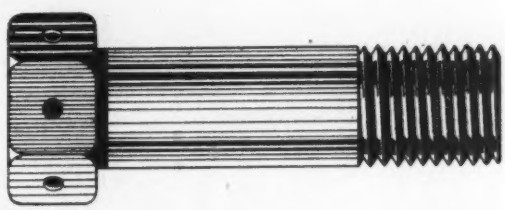
Alloy steel products and parts fabricated of steel produced by this process, in tests, reflect the high ductility properties obtained, highly desirable for high speed, high temperature operations, as for turbine wheels. When fabricated of a highly ductile alloy, turbine wheels have the ability to equalize stresses, adjusting to abnormal operating conditions without failure.

Standard 0.505-inch test bars taken from the center of a turbine wheel fabricated of a high temperature alloy made by the Kellogg method exhibit



"WELL DONE *by Leonardo da Vinci*"

It was the custom among the Old Masters to sign their work "Bene facit", or well done. They did this only if they were satisfied that they had created something to the very best of their ability. If that practice survived today, every CHANDLER cold wrought metal fastener would bear the stamp, "WELL DONE BY CHANDLER PRODUCTS CORP." A manufacturer as well as a craftsman has a right to be proud of his work, if the work is good. Our work *is* good; discriminating customers *insist* on it, and so do we. We are a compact and highly efficient organization for the precise cold wrought manufacture of a basic industrial specialty, in many designs, and according to individually exact specifications. If you have particular assembly work that requires particular metal fasteners, feel free to consult with us.



CHANDLER PRODUCTS CORP.

1491 CHARDON RD. CLEVELAND 17, OHIO

an elongation of more than 20 per cent, whereas turbine wheels fabricated of an alloy of the same chemical analysis but made by other commercial methods usually exhibit an elongation in the order of 2 per cent. Generally, in the case of such products, tests indicate ductility is 5 to 10 times greater in the Kellogg alloys. Thus it would appear that when yield strength and ductility are combined as a yard stick of quality, the new process is capable of producing either a stronger alloy for a given ductility or greater ductility for a given strength.

Hundreds of tons of high speed tool steels were produced by this process during the war. Tools were made of special alloys in both the cast and rolled conditions, and those made directly from cast metal functioned as well as forged tools of the same analysis. Many stainless steel alloys of the chromium-nickel types work-harden to an extent making them difficult to machine, whereas Kellogg alloys in this group show definite improvement in machinability.

For high temperature resistant applications, the Pullman Inc. subsidiary is undertaking research and is cooperating with industry and government agencies toward production of new alloys capable of withstanding temperatures of 1500° F and higher.

Continuous casting makes available small research heats of 25 to 50 pounds quickly, without any special conditions, in the same equipment used for volume commercial production. This permits quick delivery of small orders and eliminates the uncertainty involved in translating experimental data obtained on small induction furnaces to full-scale operation. Continuing development has perfected the process with a single ingot production machine now being operated at capacity. To fill orders already received a multiple-ingot production unit is being built at the Kellogg Jersey City plant and will be in operation early in 1948.

Shipyard Crane to Have 500 Ton Capacity

High speed with light loads and slow speed when heavy loads are being raised or lowered is the function of the Maxspeed system of hoist control developed by General Electric Co., Schenectady, N. Y., and to be installed in a crane of 500 tons deadweight capacity. Said to be the world's largest, it is to be installed at the San Francisco Naval Shipyard, Hunters Point, Calif.

New to lowering operations but not uncommon to hoisting, the system is operated by the hook load reaction which regulates the voltage supplied to the hoist motors. General Electric is supplying motors, generators and controls to Alliance Machine Co. of Alliance, O., designer of the crane project. When completed it will be capable of lifting the turret from a class A battleship and move it anywhere in a two-block area for repairs.

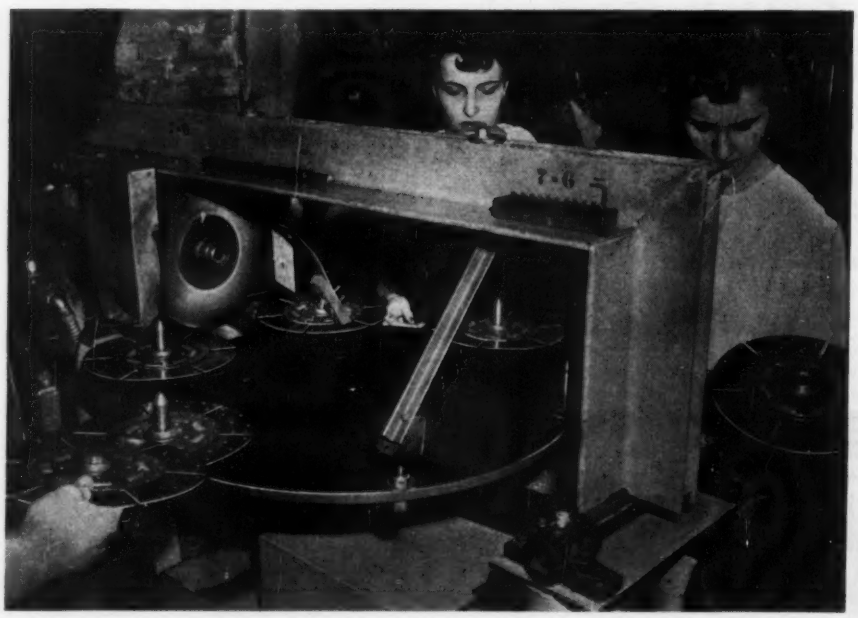
PRODUCTION COSTS HALVED

. . . by power-brush cleaning

OIL, grease and dirt, formerly removed from automobile and truck clutch plates by a hand cleaning operation in the Cleveland plant of Monmouth Products Co., now is being removed by a semiautomatic power brushing machine with a resulting 50 per cent reduction in production cost.

Of original design, the machine was designed jointly by Monmouth and Osborn Mfg. Co., also of Cleveland, manufacturers of industrial brushes used on the machine. It fits into the production schedule as the step prior to final inspection.

Operation is in conjunction with a revolving turntable which is synchronized with the production of an adjoining punch press which simultaneously flattens the plates and numbers them. Projecting upward from the turntable are six stations in the form of spindles, upon which the punch press operator places the clutch plates for cleaning and inspection. The turntable rotates at the rate of two revolutions per minute, carrying the plates, one at a time, to the location of the power brushes.



Mounted above and below the turntable as shown in the photograph are 12-inch diameter Monarch brush sections filled with untreated Tampico fiber which complete the cleaning operation by a combination spinning and brushing action. Each set of brushes consists of four sections mounted together and forming a 2-inch brushing surface on each side of the plate. Power is supplied to the brushes by an electric motor which turns them at the rate of 1800 revolutions per minute.

One of the advantages reported from the combination spinning and brushing action is that the brushes do not load up. It is also said that the brushes leave a thin coating of oil on the plates to prevent corrosion.

According to the manufacturer, the previous method of operation required four operators to hand clean and inspect the production of about 3000 per day. Since the advent of the semiautomatic machine, two girls are required for the inspection and production has jumped to 3100 plates per shift.

You'll be amazed at what can be made with Bundy Tubing!

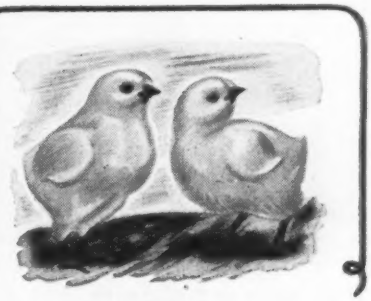
Whatever you make . . . refrigerators or stoves . . . camera tripods or chicken brooders . . .

Chances are, Bundyweld* Tubing can reduce costs, shorten production time and improve quality.

Want proof? Here it is. Here, too, are some red-hot new ideas on Bundyweld for wide-awake manufacturers.

1 **A cold** welcome's assured with Bundy Tubing in a refrigerator. Bundyweld is double-walled from a single strip. **Result:** thinner walls but equal strength, increased conductivity. That's why top refrigerators have used it from the start.

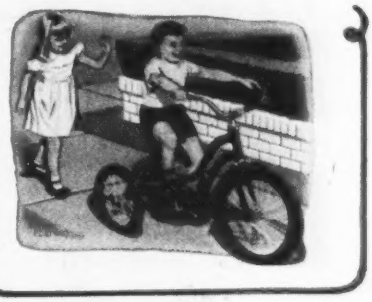
2 **A hot** welcome is in order when it comes to stoves. And hot it is in modern ranges using dependable, long-life Bundy *steel*. Here's a use for Bundyweld ductility, uniform tolerances and machineability that's right off the front burner.



3 **Even chickens cry** for it, since one ingenious designer specified Bundy Tubing to carry fuel oil in a new chicken brooder. Easy-to-fabricate Bundy Tubing is readily adapted to tricky turns, and stays strong when bent to special shapes.

4 **Shutter-bugs,** too, say Bundy clicks. They find Bundy Tubing makes good tripods . . . strong, yet lightweight—a steady base for cameras. Bundyweld, with its unique double wall, is right in focus for many structural applications.

5 **New uses** for Bundy Tubing keep popping up all over. Radiant heating, for example. Bundyweld offers faster heat conductivity, because walls are thinner with no sacrifice in strength. Bundyweld is ductile, too . . . fits many contours.



6 **Tricycles** or garden tools . . . thousands of new uses for Bundy steel, Monel and nickel tubing await application by alert manufacturers. Tubing may help harness your idea more profitably. No other tubing offers Bundyweld's exclusive features.

7 **Successful** Bundyweld applications of today were once nothing more than undeveloped ideas. Bundy engineers have often helped in their development, for they know how and where tubing can be used to advantage. A Bundy engineer can probably help you with your idea. Call or write *Bundy Tubing Company, Detroit 14, Michigan.*

BUNDY TUBING

*REG. U.S. PAT. OFF

ENGINEERED TO YOUR EXPECTATIONS

®

WHY BUNDYWELD IS BETTER TUBING

1 **Bundyweld Tubing,** made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

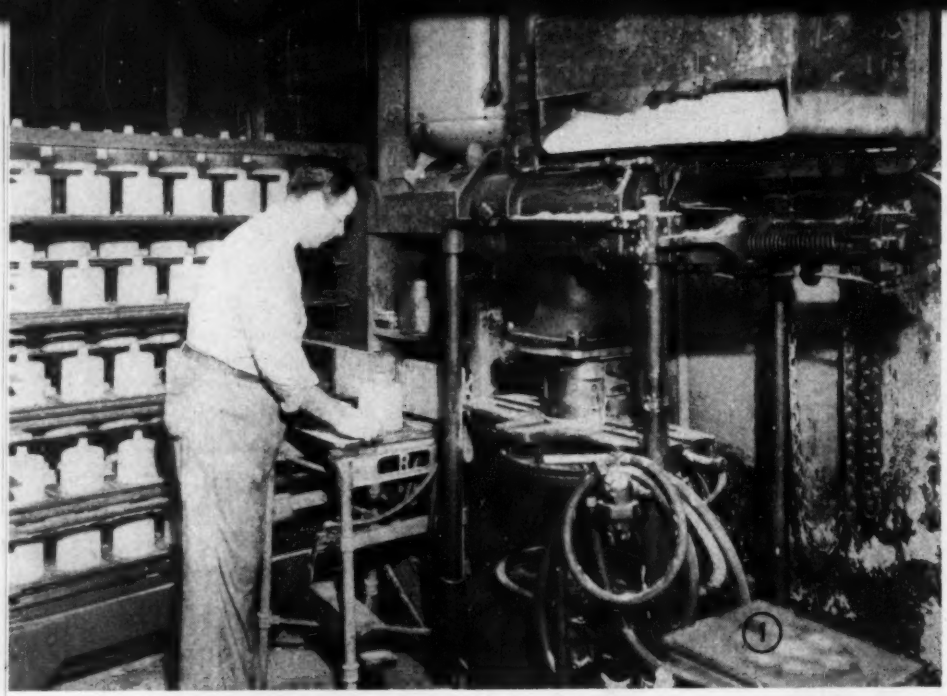
3 **Next,** a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong, ductile tube, free from scale, held to close dimensions.

4 **Bundyweld** comes in standard sizes, up to ⅝" O.D., in steel, Monel or nickel. For special sizes or tubing of other metals, call or write Bundy Tubing.

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

Standard Tube Sales Corp. 76-01 Woodhaven Blvd. Brooklyn 27, N.Y.	Peirson-Deakins Co. 823-824 Chattanooga Bank Bldg. Chattanooga 2, Tenn.	Lapham-Hickey Co. 3333 W. 47th Place Chicago 32, Ill.	Rutan & Co. 404 Architects Bldg. Philadelphia 3, Pa.	Pacific Metals Co., Ltd. 3100 19th St. San Francisco 10, Calif.	Eagle Metals Co. 3628 E. Marginal Way Seattle 4, Wash.	Alloy Metal Sales, Ltd. 861 Bay St. Toronto 5, Canada

Bundyweld nickel and Monel tubing is sold by International Nickel Company distributors in all principal cities.



COMPRESSED AIR USED AS

Major Power Source

...in building conveyors

IN the manufacture of materials handling machinery, at the Passaic, N. J. plant of Robins Conveyors division of Hewitt-Robins Inc., major source of production power is compressed air.

Beginning in the foundry, where castings of numerous types and sizes are made, this power source is employed on many operations in the preparation of the molds used in casting. Here molding machines use air to carry out various operations, including vibrating and compressing the sand in the molds, shaking loose plates that compress the sand, and removing any remaining sand particles from the machine before they receive the patterns.

In addition, some of these machines are arranged to upend the mold by means of compressed air. Portable tampers are also employed for packing sand in certains molds. Large molds are dried with a torch that uses a mixture of air and fuel oil. Sand particles are blown from the molds.

Preparing Cores — In the core department, where cores for use in the casting molds are prepared, compressed air is used in conjunction with oil cleaning cores and is also utilized in the operation of the core blowing machine shown in Fig. 1. Here sand is automatically fed into a form where air pressure forces it

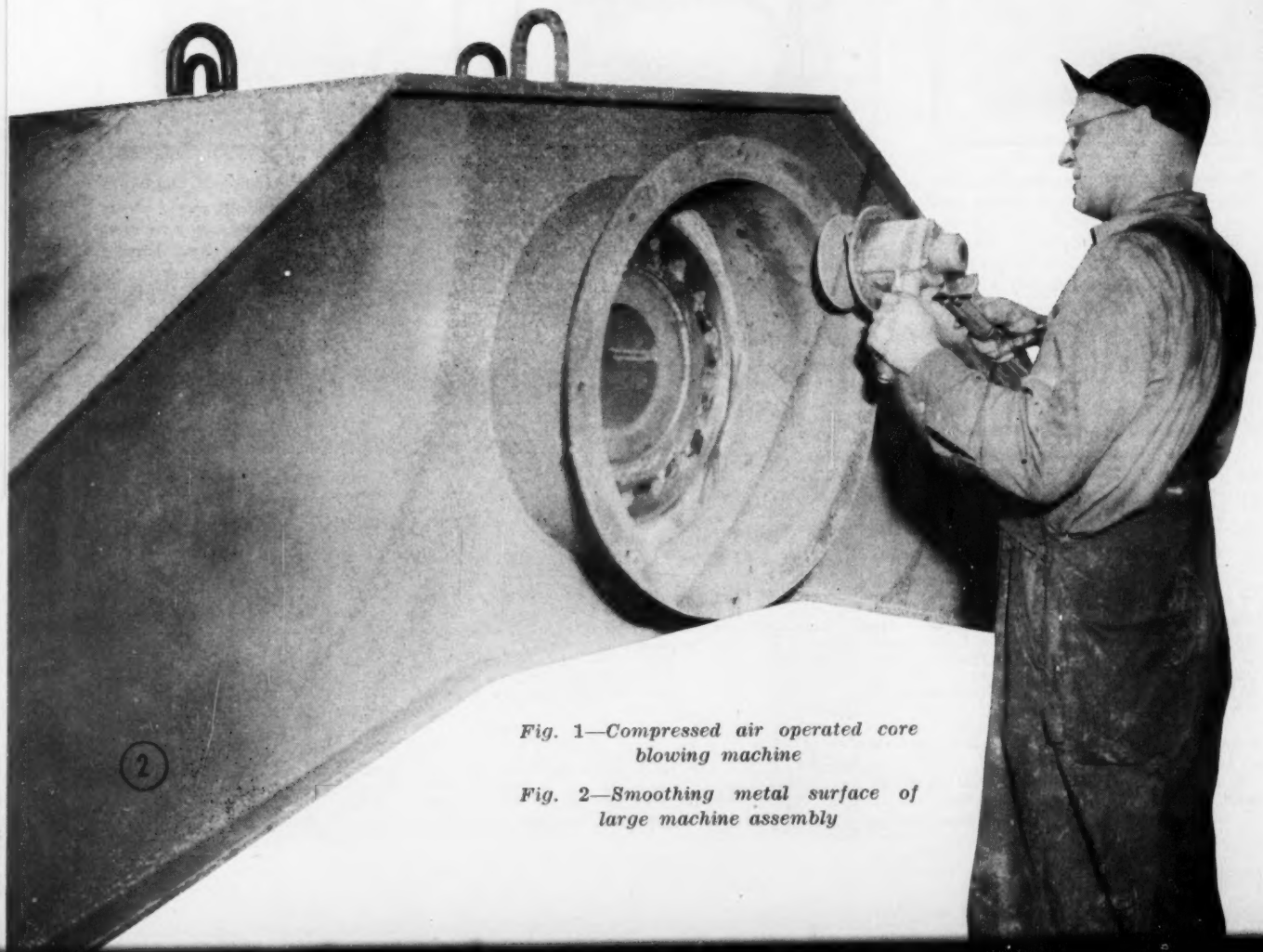


Fig. 1—Compressed air operated core blowing machine

Fig. 2—Smoothing metal surface of large machine assembly

ELECTROLUX saves thousands of dollars per month by using J&L ELECTRICWELD TUBING...

...sets new production records, makes better cleaners at lower cost

Electrolux Corporation, a true leader in its field, guards its product reputation carefully. The market that Electrolux has built for its vacuum cleaner in more than twenty years rests solidly on a foundation of efficiency, quality and dependability.

At one time, Electrolux inspectors rejected as much as 35% of the tubes needed for the Electrolux cleaner hose assembly because they did not measure up to the maker's inspection standards. This constant rejection cut production of the more than one million Electrolux cleaners needed yearly to meet tremendous demands.

When a J&L Engineer went to work on the problem he learned the reasons for these rejections. Lengths of tubing which serve as *wands* or handles, nozzles and hose fittings had to be expanded at one end, swaged at the other, bent, rolled and slotted to fit together perfectly. Then, all pieces must first be copper plated, nickel plated and finally chrome plated to give a lustrous, long-lasting finish.

To pass through all these operations and come out as a perfectly finished product, tubing should have uniformity of cross section and thickness, high surface finish, ductility, and be easy to fabricate.

A test run in the Electrolux plant *proved* J&L Electricweld tubing superior on every count! It fabricated without weld failures and took plating excellently. Rejection of tube parts dropped to almost nothing. Production was *stepped up*, costs *reduced*, thousands of feet of tubing saved each month. Electrolux quality was maintained with a saving in time, money and materials—all important to the Electrolux policy of maintaining its prewar price and service to its several million customers.

If your profits are being reduced and deliveries delayed by production losses—if mounting rejections of fabricated tubing are a problem in your quality control—then, by all means, get the facts on J&L Electricweld tubing *now!* Call in a Sales Engineer from the nearest J&L office or write direct for your free copy of the booklet "*J&L Electricweld Tubing.*" The coupon below is for your convenience.

Advertising Department
408 Jones & Laughlin Building
Pittsburgh 30, Pa.

Please send at once copy of your booklet "J&L Electricweld Tubing."

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

JONES & LAUGHLIN STEEL CORPORATION

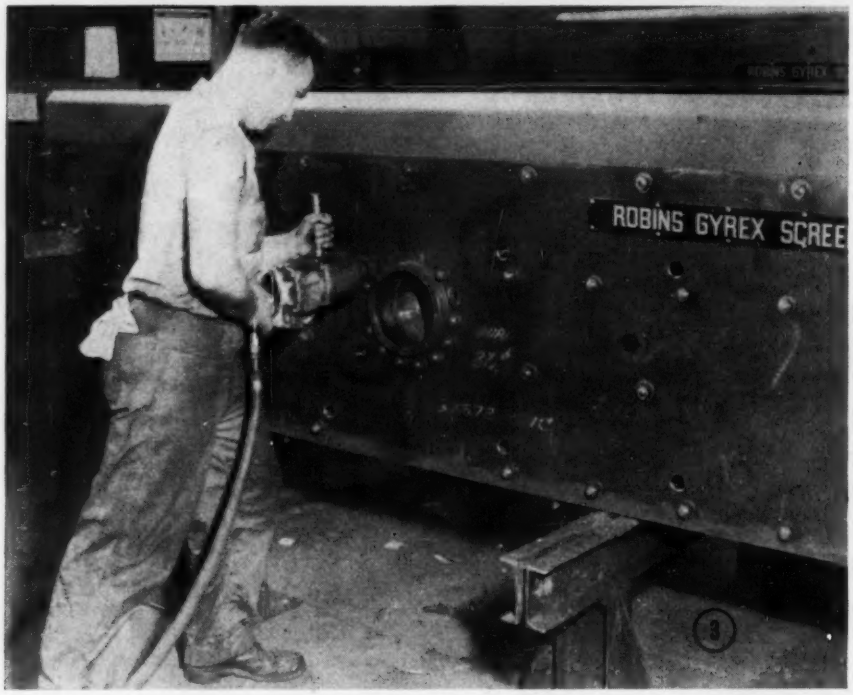


Fig. 3—Bolting up machine assembly

into every contour of the form, thus producing a superior molding core.

Iron for casting is melted in coke-fired cupolas in the foundry. Compressed air and fuel oil are employed in burners that start the melting charges burning in the cupolas.

After the castings are taken from the molds and cleaned of sand, the core sand that remains in the hollow centers of roller castings is removed by means of portable air drills. Chipping hammers are also used on castings to remove any unwanted pieces of metal.

In the machine shop, pulleys, shafting and other parts are machined to finished shape. Lathes and tube recessing machine are equipped with air chucks for rapid holding and releasing of the work, thus saving considerable time on these operations.

Fabricating Shop — In the fabricating and erecting shop, metal to be cut in the power shears is clamped by means of compressed air power while the cut is being made. On parts that have been welded, excess metal left from the welding operation is removed with the aid of portable air grinders. These grinders are also used for smoothing surfaces of metal parts that are to be fitted to other parts.

Fig. 2 shows such a grinding operation on the frame of a portable shakeout machine. This machine is another recent Robins development. It is designed to rest on top of hopper type railroad cars and facilitate the removal of their loads by means of vibrations termed "rhythmic harmonics." The performance of this device is remarkable since it can empty a 54-ton load in 1½ to 7 minutes.

Some types of equipment are riveted, using air riveting hammers, Where large machines, such as mechanical sorting screens, are assembled with bolts and nuts, air driven portable nut drivers are employed for this task, Fig. 3.

Finished parts of conveyor equipment reach the water wash type paint spray booth via a roller conveyor. Here a protective coat of paint is applied to them in a matter of seconds by means of an air spray gun.

Lubricating Bearings — Conveyor roller bearings received a supply of lubricant before leaving the plant. This is the next step after they leave the paint spray booth. Here air pressure is utilized to operate the grease pump that forces the lubricant into the six bearings on each roller unit. These bearings are lubricated by a unique arrangement, whereby the grease is applied to only one fitting until it shows up at another fitting on the far side of the unit.

Three motor-driven air compressors supply air at 100 pounds pressure throughout the plant. Two of these are 15 x 9 x 10-inch machines and are located in the engine room. The third, an 8 x 9-inch machine, is located in the idler department.

Tests Near Completion On Hot Metal Ladles

Basic tests conducted on a series of riveted and welded models of hot metal ladles have revealed some interesting variations on expected characteristics under load, according to Dr. Bruce G. Johnston and Knud-Endre Knudsen, associate director and research engineer respectively, of Fritz Engineering Laboratory of Lehigh University, Bethlehem, Pa. Although several months of computation remain before all tests can be interpreted in terms of ladle design, already some unexpected results have been obtained.

The tests, made for the American Institute of Iron and Steel Engineers, were expected to show that the sides of the ladles would bend to a marked degree at the trunnion junctions, but showed a more important characteristic in the inward motion of the entire side under load conditions with the bottom of the ladle as the point of rotation.

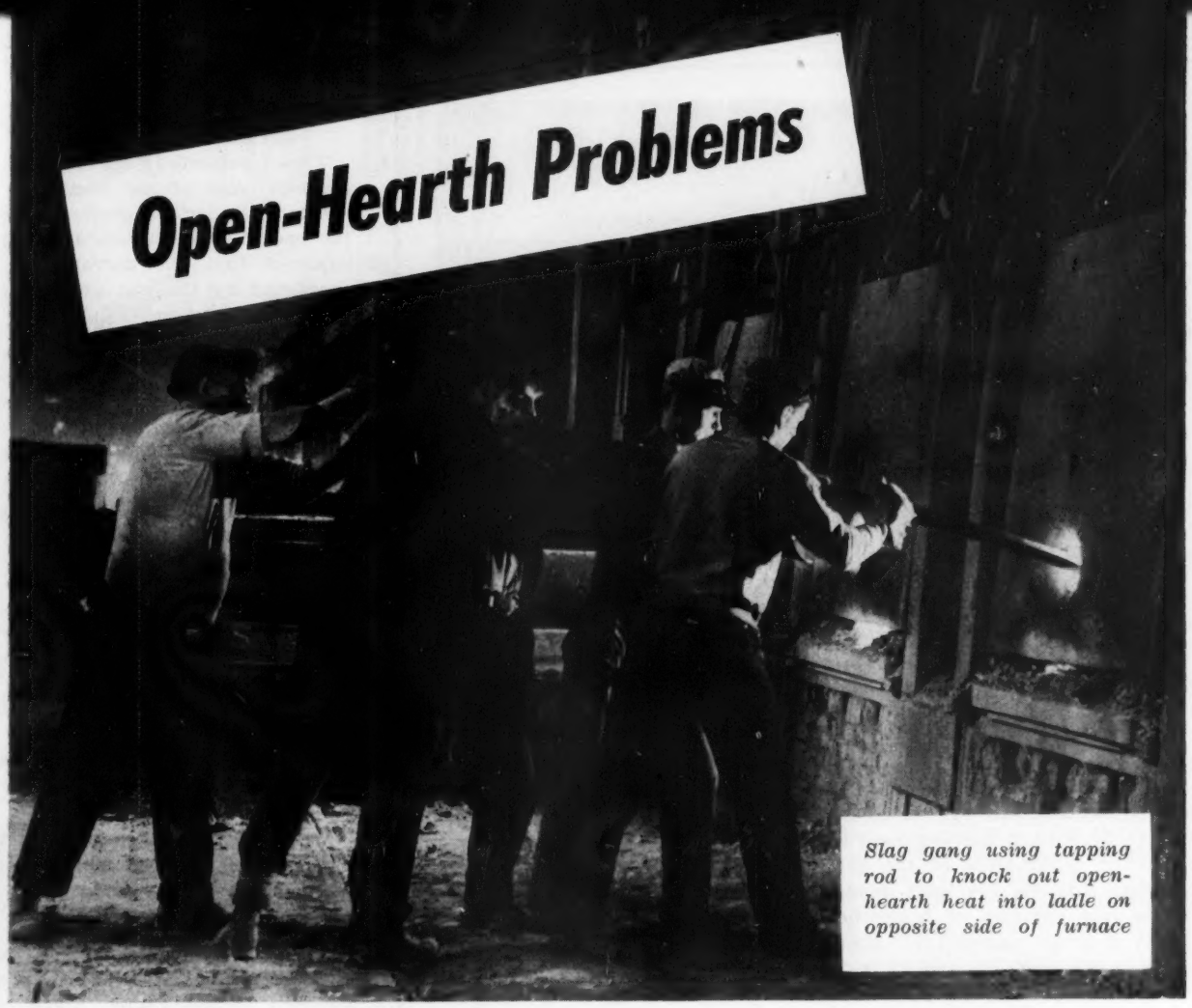
Riveted-round, welded-oval and welded-round models were used in the tests, each to a scale of one to five with a capacity of some 1½-tons. Variables included the use of different sized trunnions, flat and dished bottoms, use and elimination of stiffener rings and firebrick and the addition of a heavy reinforcing band on one model.

It is expected that final calculations will reveal traditional ladles as being too strong in some areas and too weak in others, thus paving the way for the design of new models, lighter in weight, more economical in construction and as safe, if not safer, than at present.

—o—

"Precision Hole Location for Interchangeability in Toolmaking and Production", a 448-page book on toolmaking practices, is now in its second printing of 5000 copies, according to its publisher, Moore Special Tool Co., Bridgeport, Conn. Selected by the American Institute of Graphic Arts as one of fifty books of the year, the book is said to be becoming a standard text in mechanical engineering courses, as well as in apprenticeship training courses, plus seeing wide use in toolroom and machine shops. It contains over 400 illustrations.

Open-Hearth Problems



Slag gang using tapping rod to knock out open-hearth heat into ladle on opposite side of furnace

Steelmakers alert to stepping up production at open-hearth shops are making careful study of basic ends and roofs, advantages of oxygen, melting and charging methods, feed ore and carbon block subhearth. Some concern shown over the quality and supply of certain raw materials

By CHARLES R. FonDERSMITH
Superintendent Steel Production
American Rolling Mill Co.
Middletown, O.

RECENTLY the steel industry has been subjected to various attacks in the public press for lack of production. The peculiar thing about this situation is that at the present time steelmaking facilities are producing at a record rate.

For the first nine months of 1947 the steel industry made 62,611,051 net tons of ingots—just 6 per cent less than the entire year's production in 1940. In other words, in 75 per cent of the present year, 94 per cent of 1940's total production was turned out. Indications point to a record peacetime shipment of more than 62 million tons. Steelmakers could have done better had they been allowed to, but as will be recalled, on numerous occasions plants had to bank furnaces because of strikes. This should answer the production story.

Large Expansion Program — The steel industry at present is pushing to completion a large expansion program. Total expenditures will total well over one billion dollars, covering the following increases in capacity:

3,000,000 tons of coke.
3,000,000 tons of pig iron.
2,500,000 tons of steel ingots.
3,000,000 tons of new sheet and strip capacity.

All these increases are scheduled for completion by the end of 1948 and represent new capacity.

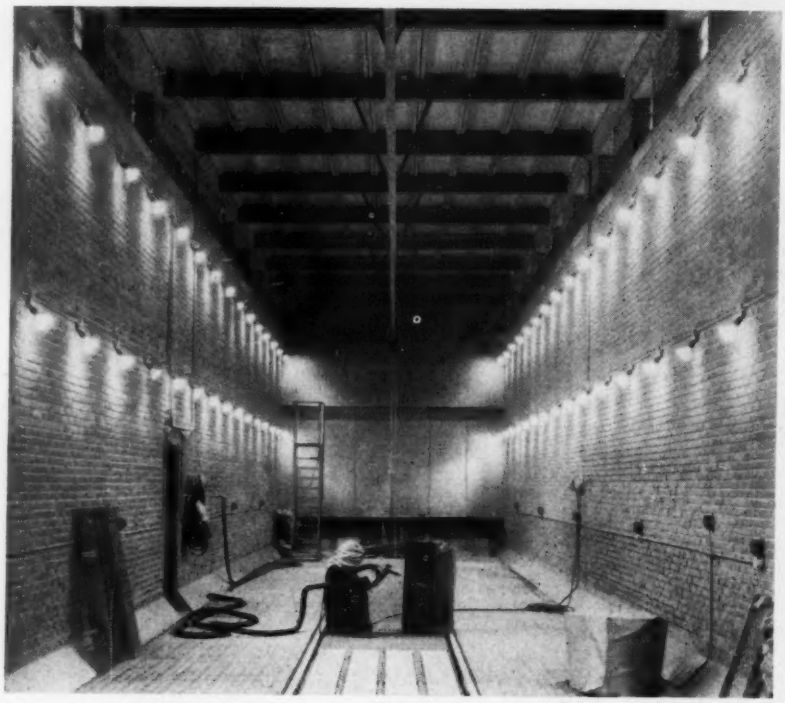
The president of a business with half a dozen divisions and 100 plants and sales offices was talking recently about the growth of his company. He made a statement which did not strike his hearers as particularly important at the time, but later stuck in the mind of one of them as having considerable significance. He said:

"We've never bought a plant or a business or added a new line of products just to be bigger. We go on the basis that anything that doesn't make us stronger is a liability rather than an asset."

Approached later to expand on the idea this executive explained that building a strong, healthy business is like building a strong, healthy body.

"Just adding weight doesn't mean that you are building; you may be only adding fat, which has to be carried. Good solid muscle doesn't add much to the size of a man, except in those spots in his body where it bulges when he works; but it adds tremendously to his punch and his lifting power. So we go for strength rather than size."

This is a pertinent point just now when the heads of so many businesses are making expansion plans. It takes courage to resist the temptation to broaden a business just for the sake of seeing it grow. The big



SHOT RESISTING LAMPS: Lighting industrial shot blasting operations without damage to lighting equipment is accomplished in this 87 x 20 x 18 ft building used for blasting parts of electric and diesel-electric locomotives at the Erie, Pa., works of General Electric Co. Using PAR-38, 150 watt flood lamps with their own reflectors, built into inner surface of heavy heat resistant envelopes, the installation has 68 lamps spaced 5 feet apart in two rows on each side of the building, rows being 10 and 17 feet above floor level. Illumination of approximately 30 footcandles is provided on the work

question is: Will we be stronger, or just bigger? The Open Hearth Committee has gone a long way since its first national meeting in Pittsburgh, April 15-16, 1925. Its growth has paralleled the growth of the steel industry, for the open-hearth department is the backbone of the industry, and these meetings had a large part to play in the progress of steelmaking practice. Perhaps here you do not get the exact solution to your particular problem, but you get a hint or an idea and you start to work on that idea and the problem is solved. The contacts you make, the friends you meet at such occasions as this also are of great assistance. I know of many times in my experience where a personal call on one of my friends gave me the hint to the solution of a stiff problem. The development of the younger men in the industry is also aided here. At the National Open Hearth Committee Meetings there are discussions in an open forum, and there are a large number of members on the committee. In fact all the steelmakers in the country belong to this organization.

Another Committee Formed — On June 30, 1943, another open-hearth committee was formed by the American Iron and Steel Institute—the Technical Committee on Open Hearth Steelmaking. To this committee 18 representatives appointed by the different member companies met to exchange information and survey the industry on questions of production, practice and process metallurgy. The meetings of this committee are usually held quarterly either at the Institute offices in New York City or in Pittsburgh. The approach to the problems are far more formal than our usual practice in the National Open Hearth Committee. This committee has to deal largely with questionnaires and official reports. Reports have been issued on:

1. Hot Metal Quality.
2. Scrap Preparation for Increased Production.
3. Utilization of Bath Pyrometers.
4. Mechanical Aids to Increase Production.
5. Determination and Comparison of Furnace Performance and Capacity.
6. Ingot Mold Practice.

Subjects now being studied include:

1. Use of oxygen, both for carbon elimination and combustion.
2. Effect of various charge ores and sinter on production and fuel rate.

These subjects were selected by majority vote of the committee as the most important problems affecting open-hearth production and it is expected that the surveys will be completed by the end of this year.

Other Problems — But there are many problems in the open hearth that neither the previously mentioned committees will solve; these must be considered by the individual handling the job. Some of these are:

1. Satisfied workers.
2. Proper synchronization of operations.
3. Maximum productive effort — less out time.
4. Quality workmanship.

In other words a well-trained team —a tight-knit, properly functioning organization — must be built. A study of the variation in productive rates of different shops, many of them comparable in size and equipment, indicates the importance of this open-hearth problem.

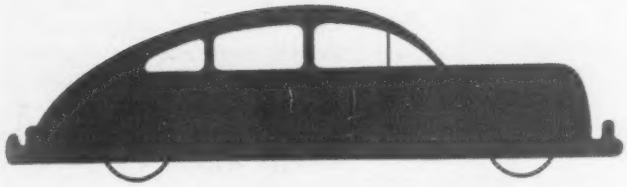
Certain definite open-hearth developments will bear watching, because of their effect on production. On the plus side, these include:

Basic End Furnaces—Three years ago the first basic end furnace was installed in the United States. In this one plant there are now a total of five, and this same company has seven such installations. In total there are now about 25 of these furnaces throughout the industry. Besides having a longer production cycle with less down time, they produce at a high rate with a low fuel consumption and have been able to pay for themselves based on lower furnace repair costs alone.

Basic Roofs — Progress is being made on working out the problems of various chrome-magnesite brick combinations over the open-hearth bath, where they are exposed to considerable iron oxide attacks as differentiated from the service exposure on the port ends. Success of this development will open the door to higher temperature metallurgy and increased production.

Use of Oxygen—There is definite proof of the advantages of combustion oxygen in more rapid meltdown of scrap charges. This is in the magnitude of a 10 per cent improvement or, in other words, a furnace using oxygen can produce steel at the same rate when using 40 per cent molten pig iron as the same furnace without oxygen using a 70 per cent hot metal charge. This practice

DO YOU BUILD AUTOMOBILES?



OSTUCO Seamless Steel Tubing and one OSTUCO fabricating operation—bending—combine to produce seat frames for a nationally-known automobile manufacturer. Complete frames are delivered to the assembly line, ready for immediate installation.

PERHAPS NOT . . . but, whatever your product, there's a good possibility it can be built better with tubing, and an even better possibility it can be built at far less cost. The examples illustrated are typical of the many products, in every industry, on which OSTUCO Tubing has cut production time and costs.

Fabricating and forming tubing is a task for specialists . . . experienced OSTUCO engineers and efficient OSTUCO craftsmen . . . men who can translate your blueprint requirements into a finished product that meets the most exacting specifications. OSTUCO Tubing, formed or fabricated to your requirements, can greatly simplify your production problems.

You can get the complete story of OSTUCO production-assistance from the nearest sales office . . . write today, without obligation.

VACUUM SWEEPERS?

Vacuum sweeper handles aren't as simple to produce as you may think! This one, for example, requires bending, slotting, tapering, flaring and beading—operations that OSTUCO completes for this manufacturer, who saves hours and dollars in production time and costs.

LAWN MOWERS?

Next time you mow the lawn, take a good look at the handle of your mower. If it's one of the new, lightweight models, it's probably made of OSTUCO Tubing, with the necessary bending, piercing, flattening and shearing operations all performed by OSTUCO.

OSTUCO

THE OHIO SEAMLESS TUBE COMPANY

Plant and General Offices: SHELBY, OHIO

SALES OFFICES: CHICAGO, Civic Opera Bldg., 20 North Wacker Dr. CLEVELAND, 1328 Citizens Bldg. • DETROIT, 2857 E. Grand Blvd. HOUSTON, 927 A M & M Bldg. • LOS ANGELES, Suite 200-170 So. Beverly Drive, Beverly Hills • MOLINE, 309½—16th St. • NEW YORK, 70 East 45th St. • PHILADELPHIA, 1413 Packard Bldg., 15th & Chestnut • ST. LOUIS, 1230 North Main St. • SEATTLE, 3205 Smith Tower • SYRACUSE, 501 Roberts Ave. • CANADIAN REPRESENTATIVE: Railway & Power Corp., Ltd., HAMILTON, MONTREAL, NORANDA, NORTH BAY, TORONTO, VANCOUVER and WINNIPEG.

should also increase the productive rate of cold metal shops, and one of its characteristics is that it will melt turnings or light scrap faster than heavy scrap. By the use of jets or lances the introduction of oxygen has definitely speeded the rate of carbon reduction, helped prevent bank and bottom delays and raised tapping temperatures. The control of roof life is one problem to be solved with this practice for it to be a real aid to production.

Multiple Melting Methods — Lack of scrap and rigid chemical limits imposed by certain grades of steel, and the development of duplex practices so as to produce steels of comparable quality to open-hearth steels, is another trend to increase production.

When used in existing steelmaking shops the duplex process will increase production by at least 40 per cent. Several companies are now doing this.

Changed Charging Methods — In order to charge the large amounts of light scrap and pig iron required in cold metal shops, several companies are considering opening the entire front end of the furnace and charging, on a continuous grate chain charger, entire freight car loads of scrap at one time. This has been in the dream stage for years and the subject of many heated discussions. For new cold metal shops it may be worth trying if used in conjunction with improved melting methods.

Charge and Feed Ores — Swedish, Brazilian, Mexican and Chilean ores have helped to remove the present shortage of good open-hearth ores. Steep Rock ore seemed to show promise of helping but has not had the test of time.

Carbon Subhearth—The result of the blast furnace work on the carbon hearth has been so promising that several plants have plans for installing carbon blocks to replace the chrome brick below the rammed or burned regular hearth in the open-hearth furnace. This development will bear watching.

Open-hearth developments on the minus side are as follows:

Deterioration in Fuel Oil — The growth in use of fuel oil has not only removed its price advantage but caused the refineries to go to different fields and refining methods, so that 1.50 to 3.00 per cent sulphur analysis oil is not unusual. This means a higher flux burden, more lime additions, more missed heats and decreased production. The heavy gravity oils appear to be getting scarcer too. These are the best melting fuels.

Decreased Scrap Supply—This, to operators conversant with the problem, needs no enlargement. How the "junkie" was priced out of the picture, the displaced scrap at the bottom of the ocean or scattered to the four corners of the world; the increasing competition of electric furnaces for open-hearth grades; the lack of large scale scrapping programs—these all tend to lower the potential scrap reservoir.

Scrap Quality — With the scrap shortages there were up-gradings of scrap classifications and competition between buyers as well as contamination from returned or scrapped war supplies with chrome, nickel and molybdenum. These problems are especially troublesome to the sheet and strip steelmaker.

Temperature Limitations — Unless constant improvement is made in hearth refractories the development of the higher temperature metallurgy possible with the all-basic furnace, with or without the use of oxygen and increased fuel rates, will be retarded due to refractory limitations. The manufacturer should be working hard in this field to be ready to meet the requirements of the steelmaker.

Charge and Feed Ores — The war time demands and scrap shortage have caused an unprecedented withdrawal from our ore reserves. The supply of high-iron content, proper analysis, clean and good physical property ores is definitely limited. Foreign imports, however, are showing promise.

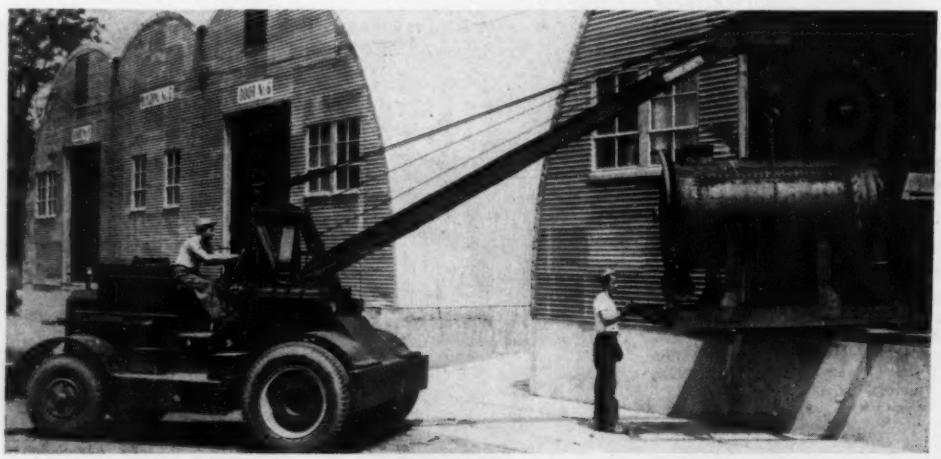
All of these developments should be watched closely because they will be discussed more and more in future meetings where open-hearth operators get together.

The future of the open hearth is bright. The past history of the practice and the ability of the men handling the development of its future are sufficient evidence that it will not be a static part of the steel industry, but the most progressive section of a most progressive industry.

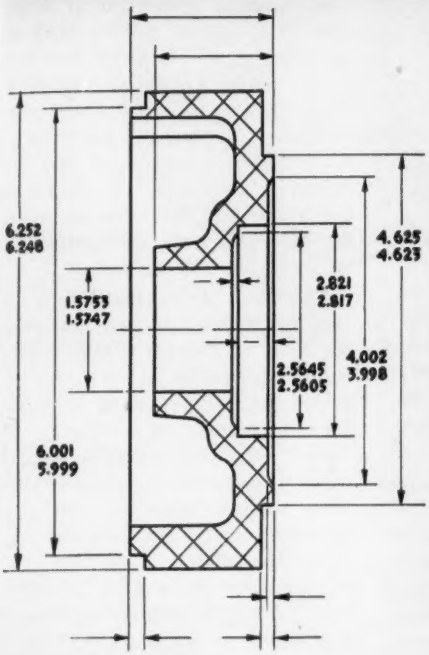
J. W. Elliott in his book entitled the "Whole Story", presents 112 words as follows:

"Men of principle are the principal men. Work is life and good work is good life. It isn't what you know, but how well you know that really counts. For, good friend, the trouble in business is not the lack of men with ability, but the terrible lack of ability of men to use their ability. In life it is just as important to forget some things as it is to remember others, so don't forget to remember and always remember to forget. And keep on keeping on. For you are judged by the record that you make, not by your ability to make a record. It is not so important to be serious as it is to be serious about important things. The monkey wears an expression of seriousness which would do credit to any college student, but the monkey is serious because he itches."

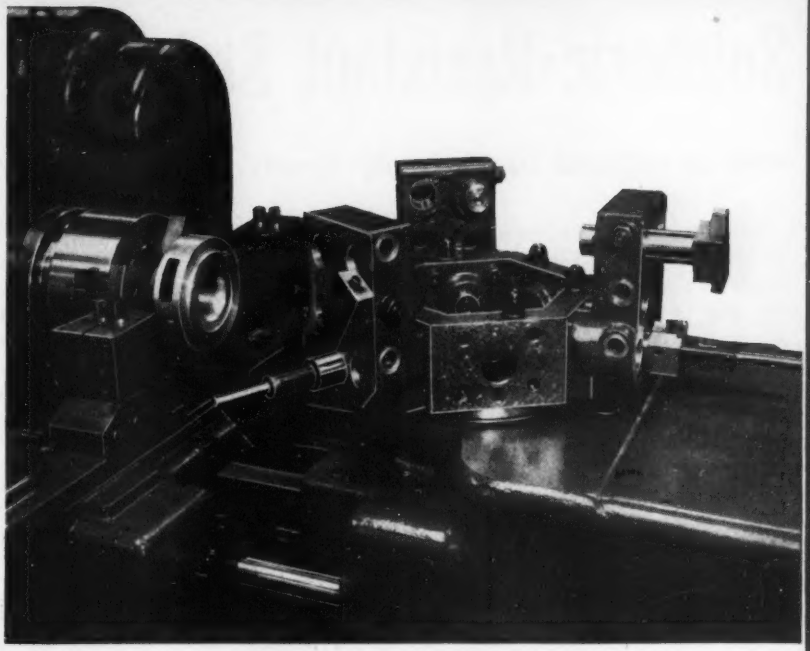
A paper presented before the Eastern Section, National Open Hearth Committee, AIME, Philadelphia, October 17, 1947.



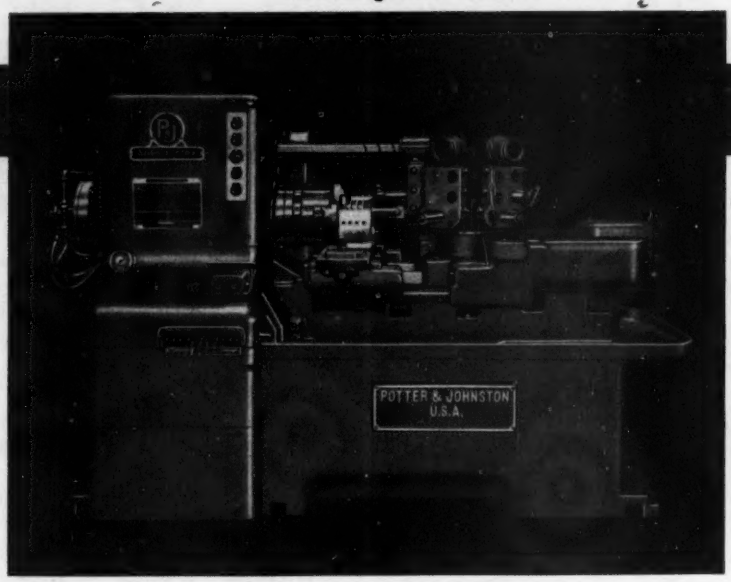
FOR HEAVY WORK: Recently placed in operation in the York, Pa., plant of York-Shipley Inc. is this gasoline driven, 6-ton capacity Roustabout crane, made by Hughes-Keenan, Mansfield, O. It is used for heavy loading and unloading work at the company's new Quonset plants



THE PART... Aluminum mounting end plate demanding *fast* metal removal



THE METHOD... Combination setups of simple turning tools and boring bars



THE MACHINE... P & J's

3-U SPEED-FLEX

the new Automatic Turret Lathe which gives "special tool" efficiency with versatile, low cost standard tools on many jobs like this.

High spindle speeds plus P & J ingenuity in combining operations plus instant chucking with stop pin locating are just some of the reasons why 37.5 of these parts are roughed out in a 51 minute hour—every hour—by the 3-U Speed-Flex.

This piece is rough bored, counterbored, rough turned; shoulder is faced, both sides of rim are faced, outside shoulder is form turned; all these surfaces then are "rough" finished and finally inner shoulder is size-turned. Only three turret faces are used.

If you have work up to 6 inches in diameter—nonferrous or ferrous castings, forgings or pressings—write to P & J for details on the 3-U way of cutting your costs by getting out more work to closer limits in less floor space. Operators prefer the 3-U Speed-Flex.

POTTER & JOHNSTON

MACHINE COMPANY, PAWTUCKET, RHODE ISLAND

Sulphuric Resistant Stainless

now produced in wrought forms

RECENT reinforcement to the ranks of corrosion-resistant stainless steels is a sulphuric acid resistant alloy that is now available in wrought as well as cast form. Designated as stainless No. 20, the material in its wrought form is produced by Carpenter Steel Co., Reading, Pa., for such applications as the manufacture of heavy chemicals, organic chemicals, synthetic rubber, high octane gasoline, solvents, explosives, plastics and pharmaceuticals. Typical uses are in pump shafts and rods, valve stems, tie rods, pipe lines, fittings, screens, etc.

Under an exclusive licensing arrangement with Duriron Co. Inc., Dayton, O., Carpenter is producing the steel in the form of hot rolled and cold drawn bars and wire, rounds, rectangles, squares and hexagons, centerless ground round bars, hot and cold rolled strip up to 8 inches wide and 0.010 to 0.140-inch thick, tubing from ⅜ to 2⅜-inches outside diameter and in standard pipe sizes up to 2 inches. Until the present time the alloy was available only in cast form, known as Durimet 20, manufactured by the Duriron organization.

Corrosion Resistance—Type analysis of the new alloy is shown in Table I. General mechanical and physical properties appear in Table II. Nickel content, fortified with high chromium and molybdenum provides a suitable matrix to place the copper in solution; this is of fundamental importance in securing unusually effective opposition to sulphuric acid. Copper has been found to be essential, increasing corrosion resistance by as much as 500 to 1.

According to Carpenter engineers, the fact that all the copper is in solid solution and not present in the alloy as a free element, practcially eliminates the possibility of copper contamination. An adequate amount of chromium is present to secure resistance to oxidizing acids and with the well-balanced proportion of nickel, an austenitic matrix results, with all the mechanical properties of the conventional 18-8 material. Molybdenum helps build a more pitting resistant or "passive" film, and provides greatly increased resistance to various chemical reagents. In some cases, the 2 per cent molybdenum is said to increase sulphuric acid resistance by as much as 100 to one.

Sulphuric Acid Solutions — Corrosion resistance (inches per year) of the alloy to various concentrations of sulphuric acid at 80° C (176° F) and at boiling temperatures is shown in the accompanying chart. Broad "band" curves illustrate the variations in laboratory corrosion testing, even though tests are made under identical conditions. As can be seen from the chart, a variety of line curves could be drawn through any set of plotted data with many interpretations of each curve. To eliminate possibility of confusion, all test data are incorporated in a band. Ability of the alloy to resist corrosive effects of sulphuric acid at temperatures of 80° C (176° F) is graphically demonstrated by this chart.

Each data point represents a 240-hour test. Entire illustration, therefore, represents nearly 10,000 hours of corrosion testing under rigid conditions. Corrosion is accentuated by aeration and agitation, thereby approximating the service which pumps, valves, and most equipment must withstand. Corrosion rates obtained are, therefore, consistently higher than those obtained using quiet, unaerated tests.

Effect of temperature in sulphuric acid corrosion is depicted by direct comparison of the two bands. At the boiling temperature, an increase

TABLE I
Analysis of New Alloy

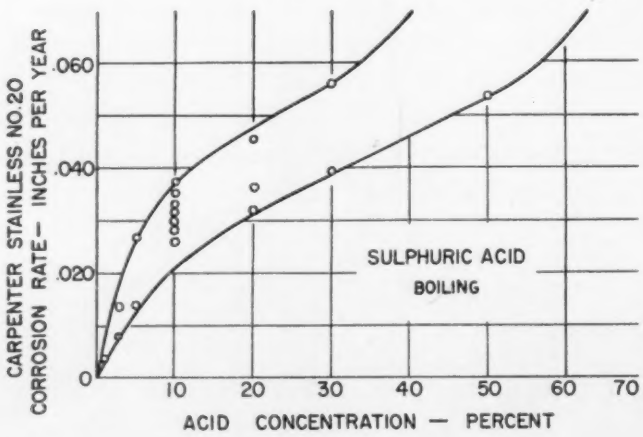
Carbon	.07% max.
Manganese	.75
Silicon	1.00
Chromium	20.00
Nickel	29.00
Molybdenum	2.00 min.
Copper	3.00 min.

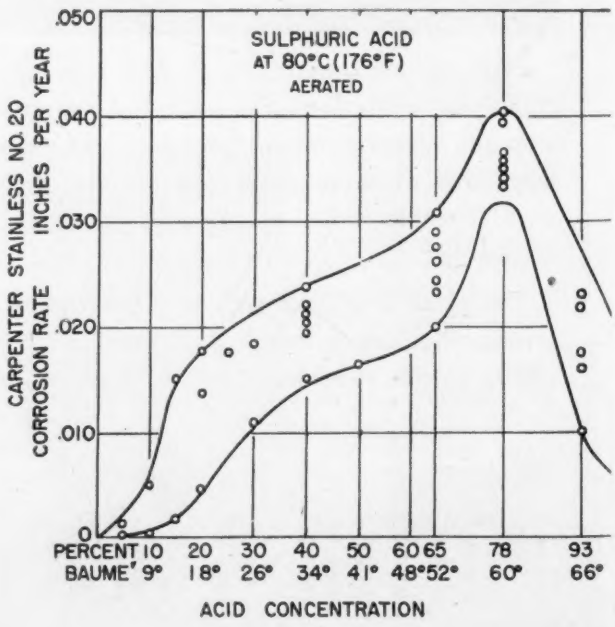
TABLE II
Mechanical Properties (1-inch round cold finished bar)

Tensile Strength, (p.s.i.)	about 85,000 min.
Yield Strength, (0.2% offset)	about 35,000 min.
Elongation (% in 2")	about 35 to 50%
Reduction of Area	about 50 to 70%
Hardness (Brinell)	about 150-180

Physical Properties

Specific Gravity	8.02
Weight, lbs. per cu. in.	0.287
Specific Heat	0.12
Melting point, deg. Fahr.	about 2650
Thermal Conductivity cgs units	0.05
Coefficient of Expansion—68° F to 1652° F.	10.31 x 10⁻⁶





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Specialized Industrial Cleaning
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in acid concentration results in a rapid increase in the corrosion rate. Again, the "band" is used to enclose the variation of test data. Very high corrosion rates in the order of 1 inch penetration per year were obtained at concentrations over 50 per cent. The "hump" is indicated with the maximum point at the 78 per cent acid concentration. Tests run at 21° C (70° F) show no hump in the corrosion curve for the new alloy. Corrosion rate is negligible in the various concentrations at room temperature.

Presence of Contaminants — Sulphuric acid solutions containing contaminants usually have a pronounced effect on the resistance shown by the material. These contaminants may act as inhibitors, accelerators, or may have no effect whatsoever. Inhibtors are generally oxidizing agents such as ferric sulphate, copper sulphate, or nitric acid. The presence of 0.02 per cent (one part in 5000) ferric sulphate so effectively inhibits the corrosion that losses may be reduced as much as 100 times. Other inhibitors show the same effect, but not necessarily to the same degree as ferric sulphate.

The alloy is reported to be especially resistant to nitric-sulphuric acid mixtures. Presence of any oxidizing agent will extend the limiting concentrations and temperatures for satisfactory service.

When hydrochloric acid and certain halides are present in sulphuric acid mixtures, the corrosion rates are accelerated.

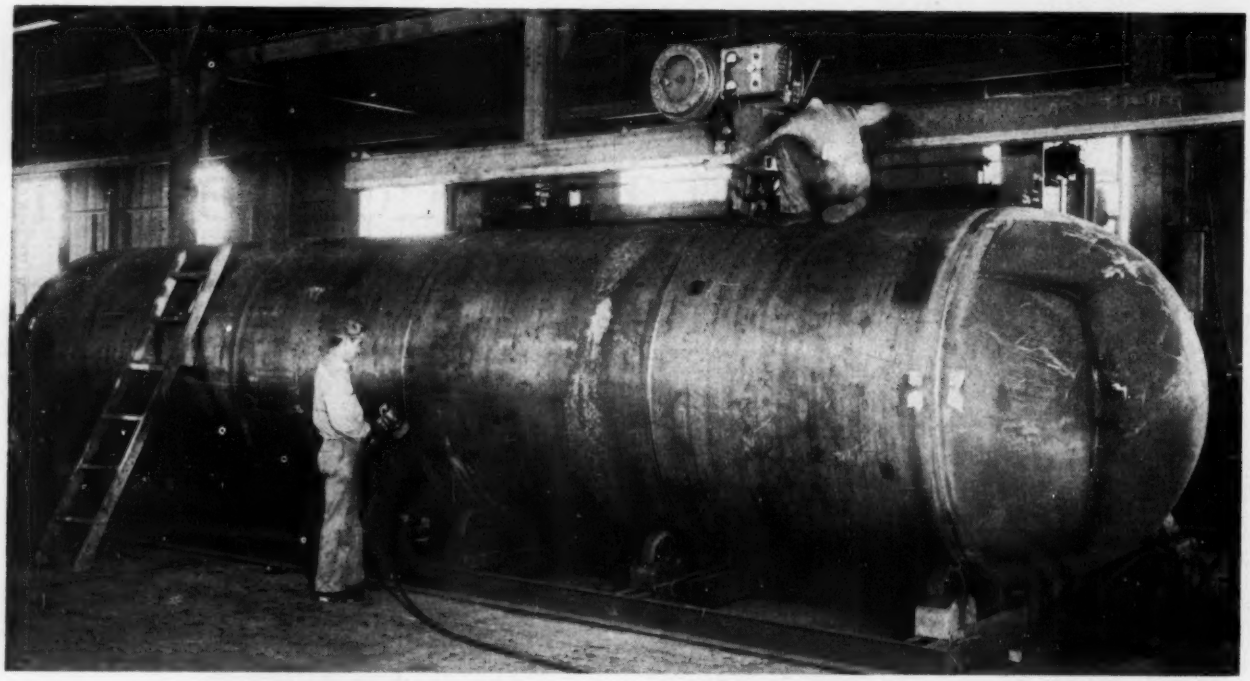
This certain alloy is extensively used in equipment for sulphuric acid pickling of steel, but the addition of ordinary salt or other chlorides can materially shorten the life of the acid resistant parts.

Heat Treatment — In heat treatment, the material like any other austenitic alloy, cannot be hardened by thermal treatment. Water quenching after heating uniformly to 2100°F results in maximum corrosion resistance; such treatment is given to the material in process of manufacture. In common with other austenitic alloys, the new alloy is subject to carbide precipitation when heated in (or cooled slowly through) the so-called sensitizing temperature range. Therefore it is necessary to give welded structures a subsequent water quench from a temperature of 2100°F. In the case of spot welding, however, where the time element is short, a final heat treatment is found not to be necessary.

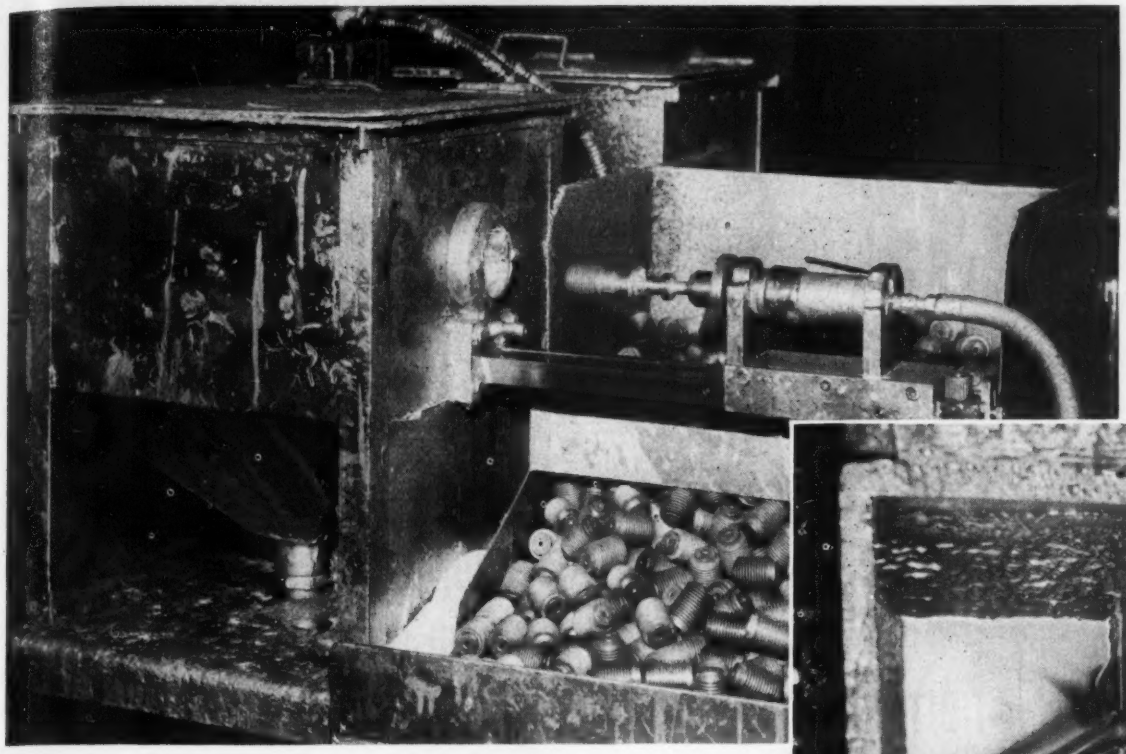
Solution of Crane Problems Sought by Navy

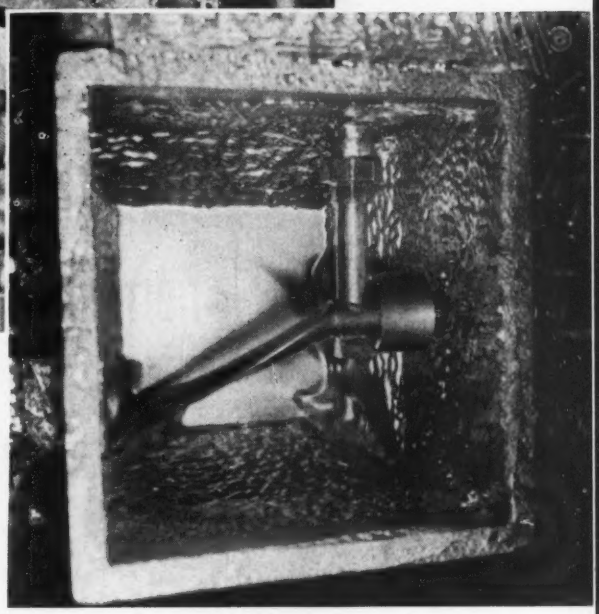
Standardization of dimensional and performance characteristics of various types of cranes such as crawler, wagon and truck, locomotive, monorail hoists and bridge cranes heads a list of problems relating to industrial cranes which Rear Admiral Joseph F. Jelley, Bureau of Yards and Docks, Navy Department, has turned over to member companies of the Navy Industrial Association for solution.

Included in the list of crane problems are: Develop simple reliable load and radius limiting devices for cranes; develop bases for mobile cranes and other types of mobile construction equipment for operation on very soft and wet ground; recommend standard procedures for inspecting and testing weight lifting hooks for defects after they have been in use; invite industry itself to comment as to whether or not it thinks the American Standards Association safety code for derricks, cranes and hoists and similar devices should be revised to make it more generally applicable in the controlling of designs.



REVOLVING TANK "JIG": Both a variable speed work rotation and welding head support are combined in the above positioning and welding unit developed by Reed Engineering Co., Carthage, Mo., for use with automatic welding heads in joining large diameter tanks, pressure vessels and other cylindrical shapes. Automatic welding head is mounted on the longitudinal track which operates parallel to the work, and is power adjusted both vertically and laterally by remote control. Turning roll mechanism includes infinite variable speed drive with multiple rubber tired wheels for rotating and supporting work. Entire unit can be adjusted to any size vessel within its range, and is designed so that it can be paired with another unit in event a track length more than 40 ft is required





Centrifugal-Force Finishing

. . . one method of painting gas-filled bellows efficiently and economically

Fig. 1 (left) —Exterior view of machine developed for finishing refrigerator bellows

Fig. 2 (above)—Close-up of the interior of machine's paint chamber

By GEORGE CAVANAUGH
Works Laboratory
General Electric Co.
Schenectady, N. Y.

PRESSURE flow coating, followed by high speed whirling for removal of excess paint, is proving to be an efficient, economical method of production finishing the small, gas-filled bellows used in many industrial control devices.

The bellows, which has eleven convolutions in its 2-inch length, is coated with an aluminum paint for corrosion resistance.

Conventional methods of applying organic finishes cannot be used because they do not provide the continuous film of finish necessary for mass production without restricting movement of the bellows.

In spraying, it is impossible to reach all surfaces because of the proximity and depth of the convolutions. Dipping will not coat all surfaces, and furthermore, after draining the coating will accumulate in globules on the lowest point of the bellows. This restricts the free movement of the bellows. Pressure flow coating is successful to the extent that the units are completely covered, however, the same globules are encountered at the lowest drain point.

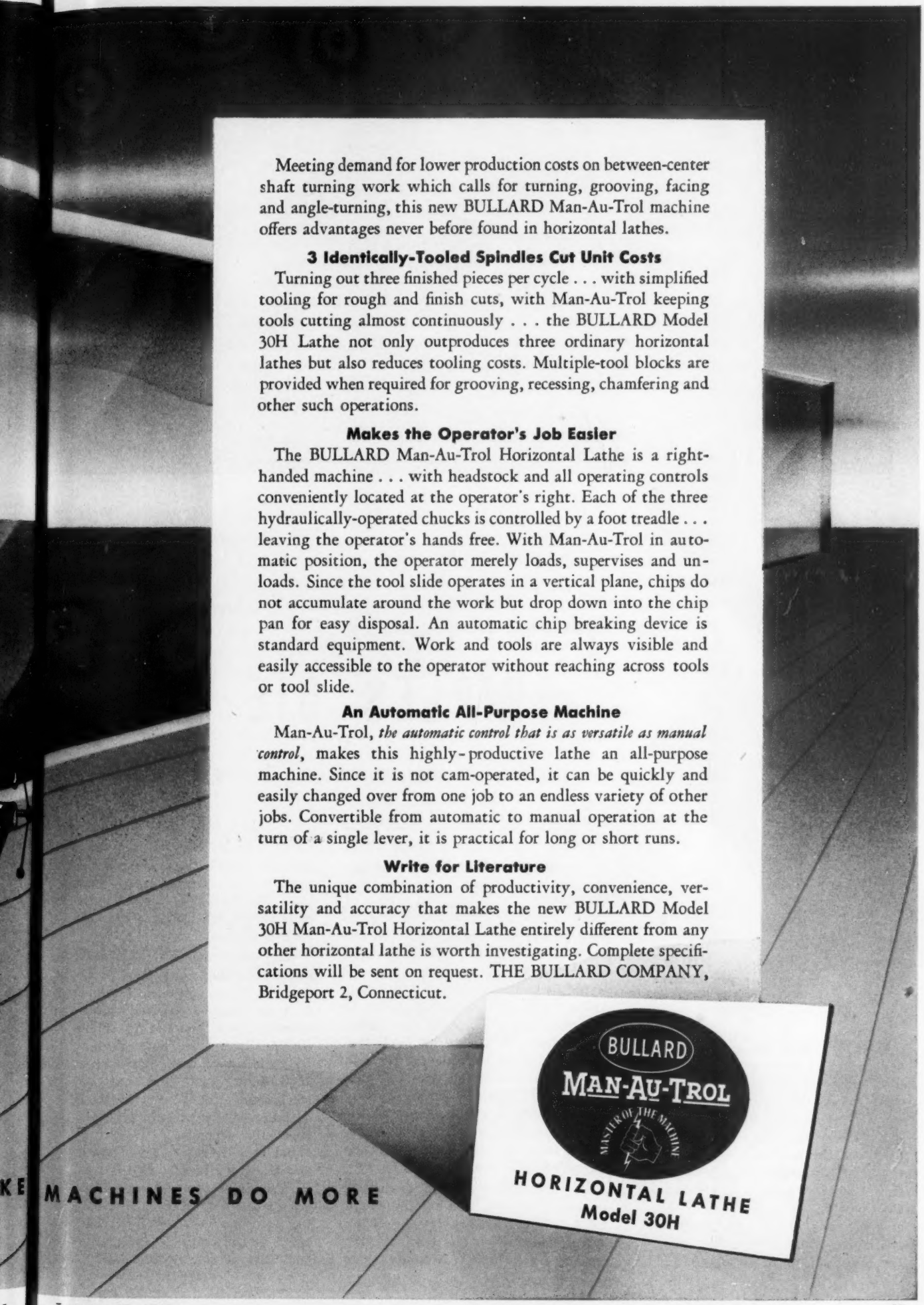
After many tests, a machine was developed that successfully coated the bellows by first pressure flow coating them and then removing excess paint by revolving the work at high speed for about 2 seconds. Centrifugal force inherent in the whirling motion causes the removal of the surplus finish that would otherwise accumulate in droplets at the lowest drain point.

Designed for the operation, the machine consists of an air-driven circulating pump for feeding the paint to a hollow nozzle, which has a series of perforations through which the paint is forced at high velocity.

The bellows to be coated is mounted on a specially designed jig attached to an air-driven rotary drill, which in turn slides on a carriage into the coating area of the machine. The bellows is then rotated one complete revolution while force-flowing the paint. Excess paint is then removed by retracting the bellows a few inches into a shielded section of the machine, and rotating for a few seconds the air-driven rotary drill upon which it is mounted.

The machine's paint reservoir contains two quarts which is sufficient for from 4 to 6 hours operation. If the machine is operated for a longer time on one filling, the aluminum pigment becomes dull due to the constant agitation of the circulating pump. Surplus paint is caught in gutters located on each side of the machine, put into containers, and reused. After painting, bellows are racked and baked in a convection type oven for one hour at 150° centigrade and then assembled into the various control devices.

NEW BULLARD METHOD
TRIPLES PRODUCTION
Model 30H MAN-AU-TROL Horizontal Lathe
produces 3 identical pieces in the time
normally required for one
BULLARD CREATES NEW METHODS TO MAKE



Meeting demand for lower production costs on between-center shaft turning work which calls for turning, grooving, facing and angle-turning, this new BULLARD Man-Au-Trol machine offers advantages never before found in horizontal lathes.

3 Identically-Tooled Spindles Cut Unit Costs

Turning out three finished pieces per cycle . . . with simplified tooling for rough and finish cuts, with Man-Au-Trol keeping tools cutting almost continuously . . . the BULLARD Model 30H Lathe not only outproduces three ordinary horizontal lathes but also reduces tooling costs. Multiple-tool blocks are provided when required for grooving, recessing, chamfering and other such operations.

Makes the Operator's Job Easier

The BULLARD Man-Au-Trol Horizontal Lathe is a right-handed machine . . . with headstock and all operating controls conveniently located at the operator's right. Each of the three hydraulically-operated chucks is controlled by a foot treadle . . . leaving the operator's hands free. With Man-Au-Trol in automatic position, the operator merely loads, supervises and unloads. Since the tool slide operates in a vertical plane, chips do not accumulate around the work but drop down into the chip pan for easy disposal. An automatic chip breaking device is standard equipment. Work and tools are always visible and easily accessible to the operator without reaching across tools or tool slide.

An Automatic All-Purpose Machine

Man-Au-Trol, *the automatic control that is as versatile as manual control*, makes this highly-productive lathe an all-purpose machine. Since it is not cam-operated, it can be quickly and easily changed over from one job to an endless variety of other jobs. Convertible from automatic to manual operation at the turn of a single lever, it is practical for long or short runs.

Write for Literature

The unique combination of productivity, convenience, versatility and accuracy that makes the new BULLARD Model 30H Man-Au-Trol Horizontal Lathe entirely different from any other horizontal lathe is worth investigating. Complete specifications will be sent on request. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

Fig. 1 (above)—Three-line induction heating fixture for heating billets for forging

Fig. 2 (left)—Billet and tractor track-link forging

Induction Heating

TRIPLES DIE LIFE

. . . by reducing scale on billets for forging tractor track links

By J. M. BUTLER
Manager, Forge Division
Willys-Overland Motors Inc.
Toledo, O.

WHEN a little more than a year ago induction heating machines were installed in our forge plant we were confident of the general suitability of this type of equipment for forging work. However, we wondered how well the machines would "stand the gaff" of continual usage adjacent to a 1500-ton press. We wondered also whether the decrease in scale and increase in die life which this equipment indicated would justify the original capital outlay.

Choice of equipment involved three standard 150 - kilowatt, 10,000 - cycle motor-generator type induction heating units manufactured by the Ohio Crankshaft Co., Cleveland. One of these machines provides power to each of the three coils visible on top of the special fixture in Fig. 1. This type of induction equipment was selected for several reasons: 1. Its rugged construction was well suited to the punishing conditions of a large forge plant. 2. The 10,000 cycle frequency is more suitable for through heating these sections than the high frequencies obtained from vacuum tube oscillators. A machine of the same manufacture had proven its dependability on another application during the war years.

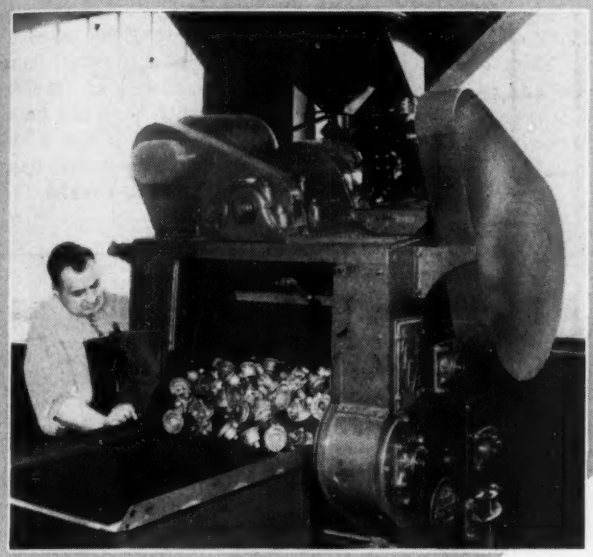
The application pictured is the one on which the induction heating equipment is currently employed. It involves heating billets for forging tractor track links. Actually there are several different size links run on this equipment, but for the purpose of simplicity this discussion is confined to one size—the medium link. Billet is 3⅜ x 1 x 7½-inches and weighs 6.8 pounds; material is SAE-1040 steel.

One man places billets in three hoppers. They are then actuated through the inductor coils by pusher feed mechanisms powered by air cylinders. Each cylinder is connected electrically to an automatic timer which is set to make a stroke every 32 seconds. Since the three pusher mechanisms are staggered, one heated billet is ejected to the press man every 10.7 seconds.

Inductor coils are 31 inches long and are comprised of 13 turns of ½-inch square copper tubing. They are known as "two stage" coils because the spacings between the turns are small at the entrance end of the coil and wide at the ejection end. Thus

The Airless Wheelabrator
CLEANS RECONDITIONED PARTS
"Good As New At Lowest Cost"

As competition becomes more and more intense in the parts reconditioning field, plant-owners engaged in this business are finding TO THEIR PROFIT that the AIRLESS WHEELABRATOR: (1) *Speeds the operation . . .* (2) *Cuts the cost . . .* (3) *Produces better work!*



The importance of time-saving, alone, cannot be under-estimated. A glance at the necessarily partial list of typical parts cleaned will show you the flexibility of the AIRLESS WHEELABRATOR. Its range of application is enormous. Former costly, time-demanding jobs are speedily handled by Wheelabrating. And the parts themselves are restored to their gleaming new appearance — uniformly clean, ready to perform at their finest!

An airless abrasive-blast (requiring no costly compressed air) cuts straight through dirt, rust, and scale in record time. Final inspection of Wheelabrated parts is swift and simple . . . one look, and any part-defects are instantly detected.

Our local representative will be glad to show you a Wheelabrator unit in operation. Find out now just how the AIRLESS WHEELABRATOR gives reconditioners a competitive weapon for success — by cleaning parts GOOD AS NEW AT LOWEST COST.

These Reconditioners Are Profiting From *Wheelabrator* Performance

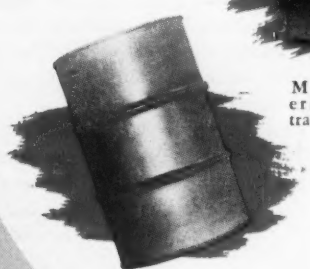
Thompson Products, Inc. — *Connecting Rods*
Newark Steel Drum Co. — *Steel Drums*
Finnell Systems, Inc. — *Floor Waxing Machines*
Guild Mfg. Co. — *Generators*
Minneapolis Gas Light Co. — *Pipe Fittings*
Pipe Line Service Corp. — *Pipe Line*
Erie Railroad Co. — *Boiler Flues*
Chefford-Master Mfg. Co. — *Fuel Pumps*

TYPICAL PARTS CLEANED

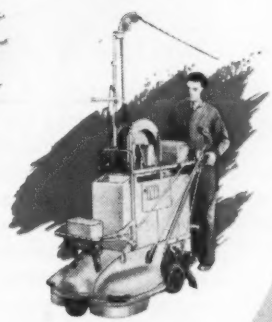
Carburetors, distributors, water pumps, fuel pumps, brake shoes, shock absorbers and other automotive parts.

Pipe, pipe fittings, boiler flues, compressors, oil burners and water meters.

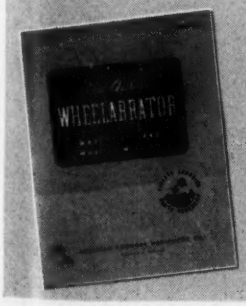
Motors, generators and transformers.



Steel drums and barrels.



Floor scrubbing and waxing machines.



THE WHEELABRATOR
What It Is . . .
What It Will Do . . .

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WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
509 S. Byrkit St., Mishawaka 5, Indiana

the first stage provides an intense magnetic field which brings the billets rapidly up to temperature; the second stage, with wider spacings and a less intense field, serves primarily to hold temperature at 2325° F. Coils are water-cooled to prevent over-heating.

Production of the complete setup is 336 heated billets or roughly 2300 pounds per hour, which figures out to a heating rate of 5.1 pounds per kilowatt hour. This conversion is somewhat above average expectancy, and may be attributed to: A very close coupling between the coil and the work; the "two stage" method of coil design described above; and the employment of the most efficient frequency for the job.

The installation provides several advantages to a forging plant. It is compact, taking little floor space; its lack of radiant heat or gases makes for good shop working conditions; and the water-cooled design of the generating equipment with completely sealed cabinets, prevents infiltration of dirt and dust.

Principal advantages, however, are the complete uniformity of heating and almost complete lack of scale which has multiplied die-life nearly 300 per cent above normal expectancy when conventional heating methods are employed. Induction heated billets have been tested with thermocouples; there is only a 20° F differential between the surface and center temperatures. By the time the billet reaches the forging press even this small differential has vanished. Scale is less than 0.001-inch compared with a normal expectancy of 0.050 to 0.100-inch when conventional heating methods are used.

Result has been that on a year-long test we have averaged 18,500 pieces per finishing die and 35,000 pieces per blocking die which is almost three times the life normally to be expected of these dies.

Method Facilitates Making Of Irregularly Shaped Dies

Making of dies for stamping fractional section of irregularly shaped conduits such as airplane engine exhausts is said to be facilitated by a method recently granted patent No. 2,402,788. The method involves a simplified procedure which may be performed by relatively unskilled workmen whereby a starting die pattern is built up to produce a final die pattern having a cavity of predetermined greater depth than that of the starting pattern. The pattern is used to produce dies for stamping flanged arcuate half sections of predetermined greater depth than the finished sections after they have been trimmed by cutting away the flanges and a part of the side walls.

LAYING OF FLAT BEAD

. . . . . increases production

IN the fabrication of cabinets for teletype printers—one of the major production items of Eagle Sheet Metal Mfg. Co., Chicago—arc-welding operations are employed which require only one-third of the time formerly consumed, principally because the flat bead created by the use of an A. W. S. specification numbered electrode has cut grinding time in half. The electrode, Fleetweld 5, is a shielded arc electrode manufactured by Lincoln Electric Co., Cleveland. Production reportedly has spiraled some 300 per cent since this procedure has been in operation.

In welding the cabinets, which are fabricated from 16-gage steel, it is essential that a good fit-up be obtained first. This is assured by tack welding the assembly and placing the cabinet into a fixture, shown in Fig. 1. This device clamps all of the pieces into a tight fit and positions the cabinet for all down-hand welding. All of the joints are butt welded, with a copper back-up being employed to increase rigidity.

Although all welds are made from the outside, they penetrate through to the inside of the cabinet. After beads are laid, a belt-grinder is used for smoothing purposes. Fig. 2, showing the cover for a printer, illustrates how the flat bead is ground to a smooth finish.

Eagle has achieved similar successes in fabricating other units. An example is a wash tank for milking, used quite generally by dairy farmers. Made entirely of 16-gage steel, all of the component parts are assembled in a jig which swings past the operator, allowing positioning for downhand welding. The ends of the tank are welded to the side member by continuous corner welds and here again the previously mentioned electrode in the 1/8-inch diameter is employed. A 1-1/4-in. pipe outlet is welded into the hole in the bottom of the tank. Small triangular inserts are butt-welded into four corner spaces of the top flanges.

Fig. 1 (above)—All down hand welding is possible on the teletype printer cabinet when welding is performed in this fixture. Tight fit of all joints also is assured

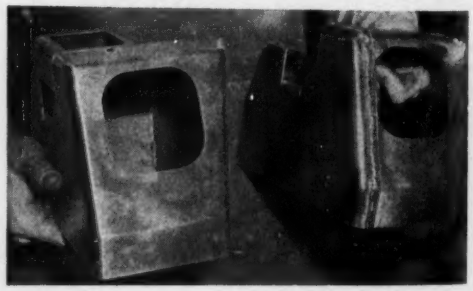


Fig. 2 (right)—Flat bead weld obtained is visible on printer cover at right. Belt grinding machine has smoothed off the bead of cover at left

LOW RAKE *means . . .*

STEELWELD
LOW RAKE ANGLE
HIGH RAKE ANGLE
SHORT SECTION UNDER PRESSURE DURING CUTTING
MORE BENDING WITH HIGH RAKE
LOW RAKE ANGLE
LONG SECTION UNDER PRESSURE DURING CUTTING
LESS BENDING WITH LOW RAKE

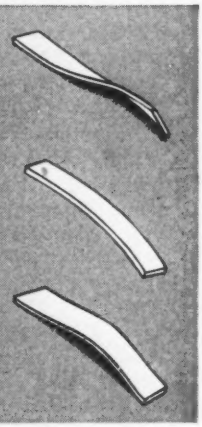
Built in all sizes for cutting thicknesses of 12 gauge to 1¼ inch and lengths up to 18 feet.

LESS

TWIST Excessive bending during cutting is the major cause of twist in pieces sheared. There is a direct relation between bending and the rake or shear angle of the upper knife. A high rake bends a piece MORE than a low rake because a SHORTER section of the stock is under pressure during cutting.

CAMBER Departure of the edges of a strip from a straight line is called camber. An important factor in causing camber is high rake which tends to rotate a sheet during cutting.

BOW Bow is deformation in a direction perpendicular to the surface of a strip. Here again experience shows that low rake gives the best results.



WHEN CUTTING WITH STEELWELD SHEARS

MORE is required of a shear than the power to cut, to achieve precision shearing. A great deal depends on how the cut is made if parts cut are going to fit accurately without additional work.

For this reason rake, or knife shear angle has been made very low on all Steelweld Shears. This of course requires more driving power and consequently a larger driving motor and heavier construction throughout than would be necessary with a higher rake. But it minimizes twist, camber and bow in pieces cut.

Because of low rake and also because of the ease with which knife clearance is adjusted to suit every plate thickness, cuts made on Steelweld shears are unusually smooth, straight and true.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7804 EAST 282nd ST. WICKLIFFE, OHIO.

STEELWELD PIVOTED BLADE SHEARS

LETTERS *to the Editors...*

Rolling Mill for India

It is pleasant to inform you that we are intending to start a rolling mill and a big workshop at Kanpur, a big business place in Northern India. Will you, therefore, help us in getting some literature of such companies who deal in up-to-date rolling, tubing and shaping machines?

Banwari Lall Gupta
46/94, Hatia Lohai
Kanpur, Northern India

Several pipe mill manufacturers have been asked to forward you literature, you should be hearing from these companies shortly.—ED.

The Pennsy Was First

We have been following with great interest the series of articles published in STEEL on antifriction bearings and their applications. In general we feel that you should be complimented on the thoroughness with which the subject is covered.

In reading Part IV of this series which covers railroad applications, we noted particularly your statement which read as follows: "The first definite progress in applying antifriction bearings on passenger cars was made more than 20 years ago when 150 cars were equipped for the Milwaukee's Olympian and Pioneer Limited, making possible longer trains with the same locomotives."

We should like to take this opportunity to point out that SKF made the first roller bearing application to main line passenger car equipment on the Pennsylvania Railroad in 1921. By the time the Milwaukee Railroad considered the equipping of their 150 cars, the Pennsylvania Railroad had in service 1646 journals equipped on main line passenger cars. The experience gained on the Pennsylvania largely influenced the Milwaukee in their final decision to use roller bearings. It is our belief that these 206 cars equipped with SKF bearings in 1921 through 1925 marked the first definite progress in the use of antifriction bearings on main line equipment in the United States.

It is interesting to note that the original SKF application on the Pennsylvania, which consisted of five P 70 coaches and one PB 70 coach, was finally retired in 1946 because of obsolescence of the car and truck equipment. Out of the original 52 bearings applied, 17 were removed and scrapped although still in serviceable condition. Each of these 17 bearings had operated approximately 3,000,000 miles and none had been repaired or any of the component parts replaced during that period.

We believe in fairness to our company and in the interest of accurate reporting, that you may want to publish this.

G. Palmgren, Chief Engineer
SKF Industries Inc.
Philadelphia, Pa.

Quoted in Guatemala

The writer just returned from a vacation in Guatemala and while in Guatemala City picked up a copy of the Bulletin, believed to be the only Engish newspaper in the Capitol. We were very much surprised to see the quotation made from your magazine in that edition and thought you would like to hear of this publicity.

W. J. Auburn, Advertising Manager
Gerrard Steel Strapping Co.
Chicago, Ill.

We quote (with pride) from the Guatemala Bulletin of Monday, Dec. 8, 1946, the Economic Review: "Steel mills set a new postwar operating rate and tonnage was the largest in peacetime history the magazine STEEL reported, however, that steel consumers are 'showing increasing concern over future supplies.' The magazine reported that consumers are pressing mills for metal and attempting to get additional tonnage on the order books because of 'apprehension over the possibility of government allocations as well as the effect of the Marshall Plan on domestic supplies.' "—ED.

Got An Extra?

I would be very pleased to obtain through the readers of STEEL, a copy of U. S. Public Health Bulletin No. 217, The Determination and Control of Industrial Dust (photostat or microfilm 35 mm).

I have written to the Superintendent of Documents in Washington, but they have replied that the stock is exhausted.

R. Dureuil
Foundry Equipments
4, Square du Graisivaudan
Paris 17°, France

Possibly one of our readers has a copy of this bulletin which could be forwarded to M. Dureuil in Paris.—ED.

All-Weather Stainless Helicopter Blades Tested

All-weather helicopter blades of stainless steel construction are undergoing exhaustive service tests at the U. S. Air Force propeller laboratory at Wright Field, O. Built by Goodyear Aircraft Corp., Akron, and installed on an R-5 Sikorsky helicopter, the stainless rotary wings are said to have lifting characteristics superior to conventional blades and may be flown safely in light or heavy rains.

One of the outstanding features of the development is the leading edge de-icing system incorporated into its basic construction. A flexible tube at the rotor head carries hot air to the root of the blade and along the leading edge. It is anticipated this design will eliminate the formation of clear and rime ice while aircraft is being operated in icing conditions.

Leading edge assembly of the new rotary airfoil is 0.030-inch stretched stainless steel with no seams or splices. Support is furnished by two spanwise spars spotwelded to the skin. According to Goodyear engineers, this combination of stretched and spotwelded stainless provides high resistance to fatigue and close control of airfoil contour. Leading edge rigidity and static balance are obtained by spanwise strip spotwelded to inside curve of the blade and lined with lead counterweighting.

Copy Miller and Automatic Bar Machine Described

An electrically operated copy milling machine and "a very cleverly and cleanly designed" automatic bar machine are described in two reports released by the Office of Technical Services, Department of Commerce, Washington. The milling machine is intended to assist in the economic manufacture of the dies and molds of all kinds, even with tough materials. The machine has three directional-table-control motors which can reach their full speed of 1400 revolutions per minute in 0.008-second and reverse their rotation twice per second.

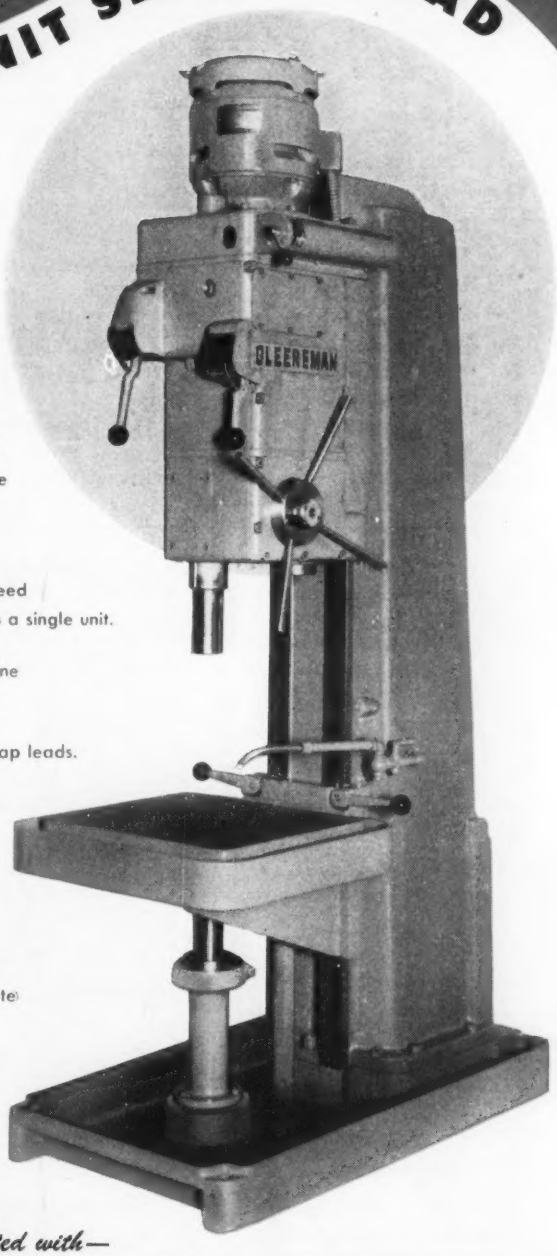
The automatic bar chucking machine is believed to be much more flexible than any automatic screw machine previously designed. Machine is equipped with four spindles and has six independently operated cross slides of the gunning type. Each spindle is provided with an individual longitudinal tool slide which is a radical departure from the conventional single tool slide with end working tools for all spindle positions.

NEW!

CLEEREMAN

325 SINGLE UNIT SLIDING HEAD

DRILLING MACHINES



employ time-tested, proven, engineering principles assembled in a new and different manner to secure simplicity of construction, extremely wide range of application and greater operating facility:

Fully enclosed Sliding Head includes spindle and feed mechanisms, motor and spindle feed transmission in a single unit.

Wide range of six or twelve spindle speeds combine extreme sensitivity with rugged strength.

Four quick change feeds. Wide range of geared tap leads.

Four position turret type feed depth stop.

plus the well-known Cleereman features of ease and simplicity of control, exceptional flexibility, easy set-up.

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BUILDERS OF PRECISION JIG BORERS & DRILLING MACHINES

Band Saw Blading—*Concluded from Page 67*

is 7/16-inch wide by 0.015-inch thick and has a million rockwell C hardness of 52. Scallops measure ⅜-inch from point to point, with a double beveled edge having an accuracy of sharpness within 0.002-inch.

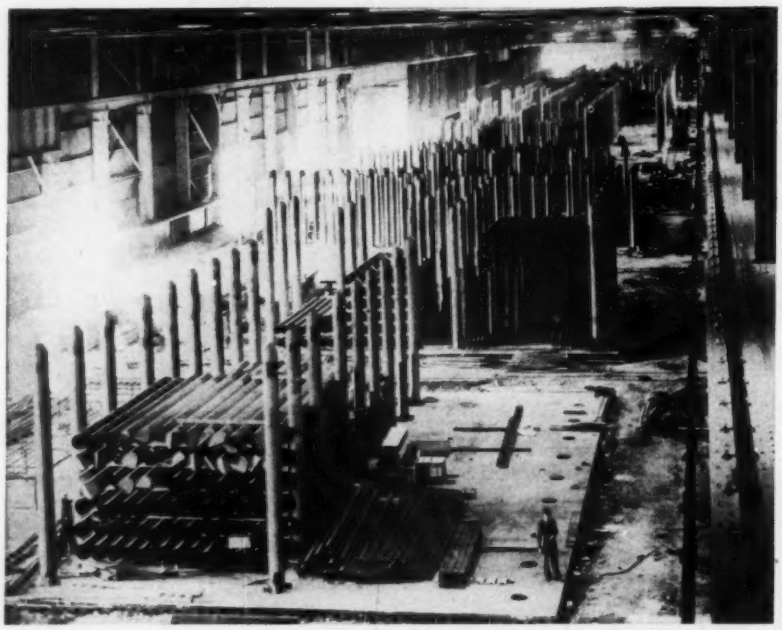
At velocities of from 3000 to 4000 feet per minute the scallop-edge blade will cut, as if it were cheese, such materials as sponge rubber, corded rubber, corrugated board, leather, cork, jute, hair, cellophane, felt, hemp and many others of a like nature. So efficient is this type of blade for cutting cloth as a whole that new equipment is now being introduced for this purpose. For cutting all textiles, the blade is operated at approximately 5000 feet per minute.

There is also a knife-edge band intended to cut paper in any form, such as stacks of news print, cardboard, books, pads, papier-mache, etc. This blade also performs quite efficiently in cutting cloth, but lacks the productivity of the scallop-edge blade. The fact remains that the knife-edge design can be most economical since any ½-inch fine pitch discarded saw band can be so finished by grinding as shown in Fig 2. Any portable grinder of a nature to be set on the machine table will do. The wheel should be from 3½ to 4-inches in diameter and ¾-inch face. A 60-K wheel can be used for the original grind to rough bevels, a much finer grain wheel is necessary for the finish grind and thereafter. The wheel should operate at its maximum surface speed consistent with its diameter.

The widely spaced tooth saw has made it possible for furniture manufacturers, plastics fabricators and users of aluminum and magnesium in all forms to speed their production tremendously. These hardened tooth saws have in all cases at least tripled previous cutting rates with finishes heretofore unheard of, equally responsible for this efficiency is their free cutting action and the widely variable high velocity range for which they are intended.

Precision Contour Saws — Friction saw band shown in Fig. 1 is of course nothing else than the so-called precision contour saw, but in a wider blade and selected pitch to do a job of a very different nature than a ½-inch saw of the same type, cutting a similar thickness of steel which is not hardened and at the correct conventional speed.

With the friction saw, Fig. 2, the very familiar chip production process is reversed because the saw speed must be increased as material thickness increases to generate that much more heat in front of the saw teeth. If the thickness were ¼-inch instead of 3 inches, a velocity of 6000 feet per minute would give the same frictional results (STEEL, Mar. 25, p. 96) as the 15,000 feet per minute necessary for the saw to penetrate the high-speed steel cutter.



WARM ACREAGE: Said to be the largest radiant heating installation ever made, the continuous enclosed system in this quarter-mile-long pipe warehouse of National Tube Co., Lorain, O., is composed of more than 25 miles of 1 in. steel pipe in 481 individual coils embedded in 10 in. of concrete. Plant covers 3 acres and contains 7,000,000 cu ft of space. Vertical standards set in floor sockets are pipe racks which, if necessary, will hold an entire month's output of various sized standard pipe. This system will facilitate mixed carload shipments

Rubber Pipe Withstands Acidic Water in Mine

Water of such high acid content that it perforated ordinary pipe within two weeks is now being transmitted successfully through rubber pipe, developed by Goodyear Tire & Rubber Co., Akron, in the Wolf Run coal mine of Warner Collieries Co., near Amsterdam, O. The water condition which led to the installation of the rubber pipe developed about 18 months ago, the mining company states, resulting from seepage from an abandoned, walled-up room.

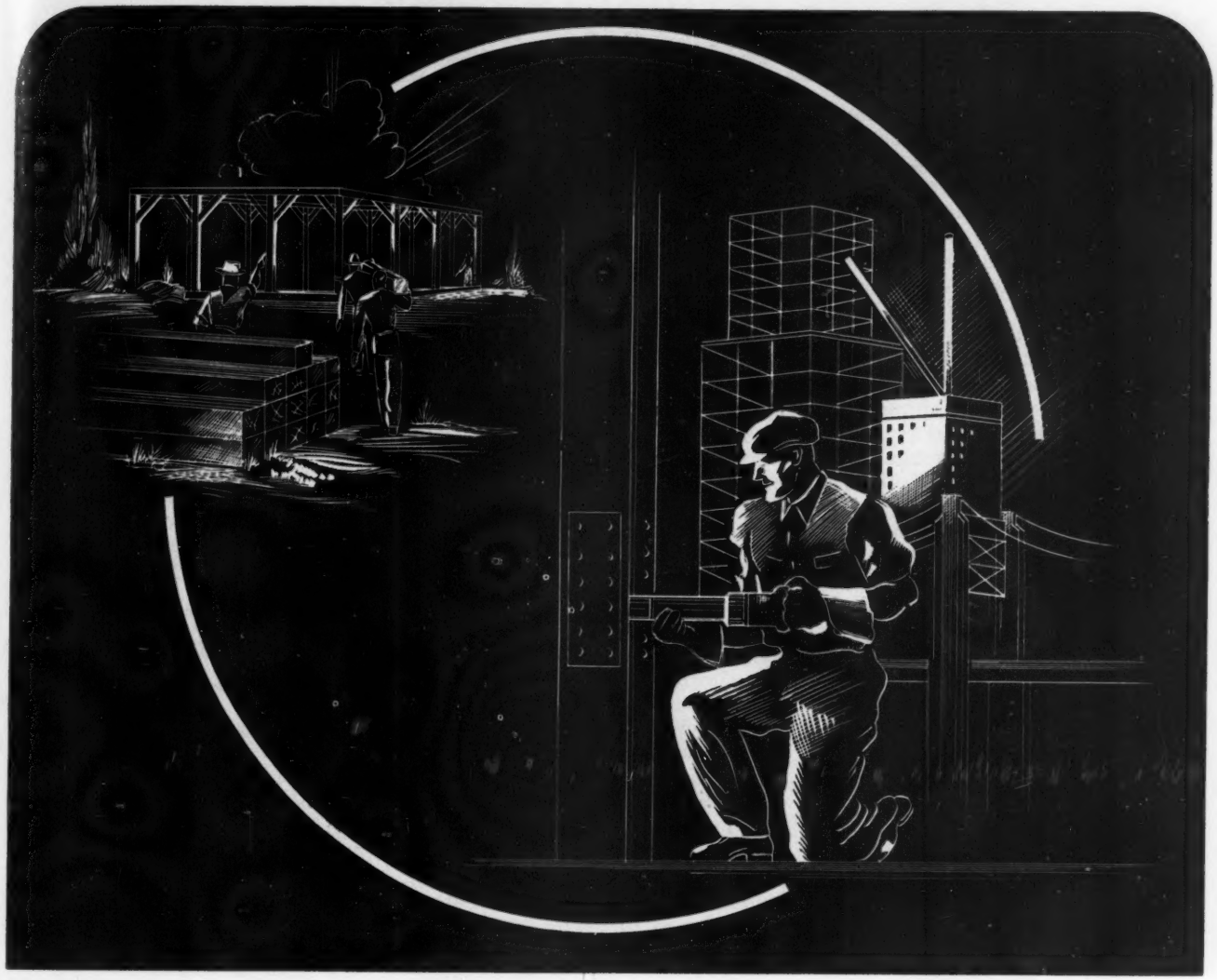
A single line of eight sections of the rubber pipe was installed, using a total of 380 feet of the rubber pipe, said by Goodyear hose engineers to be compounded to conduct corrosive chemicals. Flexibility of the Diversipipe, as it is called, permitted use of an air shaft route from the pump to discharge above ground. Use of this route made possible shortening of the old line by 220 feet.

Parallel steel cables support the 4-inch pipe which is suspended vertically in air shaft between pump level and ground discharge level.

Galvanizing Film Shows Hot Dip Process Details

Art of hot dip galvanizing process in the complete operation is the subject of a 16 mm sound motion picture being distributed by Hot Dip Galvanizers Association Inc., Pittsburgh 22, Pa. Although primarily educational, the film has an entertaining theme, making it suitable for all types of audiences.

Entitled "Must it Rust," the picture shows the steel base metal actually rusting as viewed through a microscope. The "cleaning" of the base metal by the pickling process is shown and explained as is the galvanizing of various products. Metallurgical photographs of the construction of a zinc coating by hot dip galvanizing and an explanation of its formation are also covered.



SINCE 1850

THE CONSTRUCTION INDUSTRY

in its advance from timber framing to modern structures, has been paced by the production and transportation of the necessary ores from which have been made the metals that have made its development possible.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

Weldment Design—*Concluded from Page 72*

in what might be termed an ideal manner for a fillet weld, from the surface through the throat of the weld. The fillet did not fracture at its edge due to undercutting or overlapping. The fracture did not follow the boundary zone between weld metal and parent metal, as sometimes happens.

Crack Not Continuous—It is to be noted in the illustration, too, that the crack shown was not continuous. The shiny portions reveal the unfractured area of the weld torn apart in the investigation so that the fractured surfaces could be laid open. This failure, then, consisted of a series of small cracks on the surface, extending approximately through one-half the throat thickness of the weld. Cracks can be seen as the dark portions on the surface of the fracture.

Why wouldn't a fracture, started by an abnormally severe shock, progress continuously, instead of as a series of short cracks separated by narrow widths of unfractured metal and extending inwardly to about the center of the weld? That these cracks outlined a weak zone in the weld, undoubtedly caused by slag inclusions, is a logical conclusion. More minute investigation subsequently proved it.

Fracture possibly was caused by the inertia of the mechanical mass bolted to the rail during severe overall shock, such as might occur during depth bombing. The apparent significance of the failure in this engine frame is that the primary member withstood the severe shock. It seems reasonable to assume, therefore, that the design was adequate.

There were no fractures discovered in any member, failure of which possibly would have caused the engine to cease operating. Yet the design was so close to the edge in its economy that many fractures — 126 of them—did occur under abnormal shock. It would be difficult to predict the length of time that the engine could continue in operation even though these fractures existed.

Fig. 9 shows a failure radically different in nature from those that have been considered. This is a polished jacketed-type cylindrical steam drier roll, of a type produced for many processing industries such as papermaking and printing. It is apparent that something went wrong on this roll to distort it. In testing this roll with hydrostatic internal pressure, the pressure accidentally, drastically exceeded that required with the result the outer shell bulged in the manner shown in the illustration. The roll, of course, was useless in such condition and it was necessary to replace the outer shell of the roll and remachine it.

This failure is of interest because previously no one had any idea how this type of weldment would withstand abnormal loads. In this failure, there is reason to believe that maximum pressure inducing failure was several times that of the design pressure.

One-sided Corner Welds—Fig. 10 shows the construction details of the drier roll and indicates the manner of failure. No fracture occurred anywhere in the structure causing leakage. The one-sided corner welds with notches on their inner sides did not fail. This is to be particularly noted since one would expect distress at the inner notch behind the weld in the upper corner. One might expect this because of the ripping action of the bulge shown on this weld.

Ultimately, of course, something would have opened up but the accidental high pressure was discovered before this could happen. The main point in discussing this failure is to indicate the proper use of weld details that are unpredictable in other types of services; hence, liable to failure.

In contrast to the dynamically-loaded engine frames previously discussed, this drier roll weldment operates under practically static conditions. A weld of this nature is never used in the design of an engine frame. Such one-sided welds with unfused roots were used in secondary regions in a very early type of engine frame. They failed consistently in all frames produced to this design. It was necessary to revise the design to eliminate them and to repair all frames in the field.

However, there is no reason for any fear regarding the adequacy of such corner welds in drier rolls, for structures with such welds have been in service for many years. But, how such welds would behave under accidental overload remained to be seen. Whether the weld would rip due to its internal notch from the flexure caused by the bulging of the shell is a moot question. In this instance of apparently drastically abnormal pressure no distress occurred in the welds indicated.

One of the reasons for discussing this type of failure is that some designers err in the other direction of too much caution. At times fabricating shops have been furnished blueprints of designs that specify full strength welds in every joint. If followed to the letter this specification would result in an extremely costly weldment. Few, if any, weldment designs, excluding pressure vessels, require completely full strength joints at all points. This is not true for all pressure vessels, but only to thick-walled vessels subjected to very high pressures.

By "full strength weld" is meant one that is fused completely throughout the full metal thickness and subject to meticulous inspection under the usual standards. From this, it is apparent that it is incumbent upon the designer to follow the "middle of the road" with a true feeling for what a particular joint must withstand.

From data presented by the author at ASME annual meeting, Atlantic City, N. J., Dec. 3, 1947.

Standard Welding Symbols Published by AWS

Welding symbols which are flexible and yet precise and which are adaptable to every process in use are contained in the 1947 edition of Standard Welding Symbols, published by American Welding Society. Earlier editions were concerned only with gas, arc and resistance welding, but this revised edition covers 34 of the processes used in various industries throughout the country.

A revision has been made in the method of presentation, a change being made from the previous form of rules, to step-by-step presentation in lecture-type form. In addition, rules have been expanded to include a means of indicating welds having root penetration. The confusing terms "near side" and "far side" have been eliminated.

Illustrations Show Applications

Forty-five illustrations showing the various applications of the symbols have been added, along with a chart which provides a summary of the use of the welding symbols for ready reference. It is expected that inspection symbols, now under consideration, will follow the general pattern of the welding symbols, so that combined welding and inspection symbols may be indicated on a drawing.

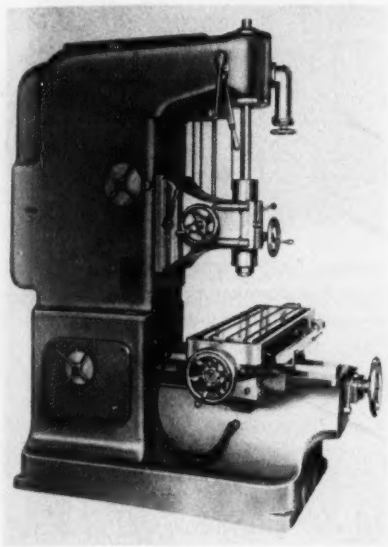
In order to assure users of the standard symbols, it is stated by the committee on symbols that it has adopted a policy which will keep changes to a minimum so that drawings, manuals, text books and standards will not be made obsolete by any ensuing changes.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 116

1. Milling, Boring Machine

Designed to make operation simple although it is adaptable to a wide range of work, the No. 50 combination vertical milling and precision boring machine, introduced by W. B.



Knight Machinery Co., St. Louis, Mo., offers high speeds and power for rapid metal removal.

Base of machine is a one piece semisteel casting which provides the rigidity for precision work. It offers the advantages of a solid base boring machine and a rigid vertical milling machine.

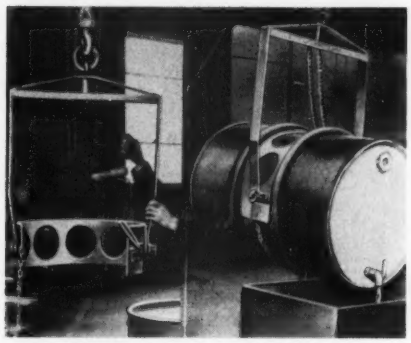
2. Cylindrical Grinder

Made in three types, the new plain cylindrical hydraulic grinding machines, announced by Landis Tool Co., Waynesboro, Pa., have Microsphere wheel spindle bearings, pressure lubricated and immersed in lubricating oil. A safety pressure switch prevents spindle rotation until a predetermined pressure is built up. Headstock is constructed for complete V-belt drive from motor to jackshaft and jackshaft to face plate.

The type F plain swings 14 and 16-inch work weighing up to 6500 pounds. Length between centers ranges from 36 inches to 168 inches. Type FF will carry work weighing up to 10,000 pounds between centers within swings of 16, 20 or 24 inches. Lengths between centers may be 48, 72, 96, 120, 144, 168, 192, 216 or 240 inches. Sixteen, 20 and 24 inch swings are offered with the type FR machine. Incrowning and concaving mechanism is included. Center distances range from 48 to 168 inches and capacity is 10,000 pounds. All three types use a 30 x 3 x 12 inch wheel.

3. Drum Handler

An efficient drum handling system may be set up with a monorail hoist, crane or chain fall using the Drum-Karrier, made by Falstrom Co., Falstrom Court, Passaic, N. J. Featur-

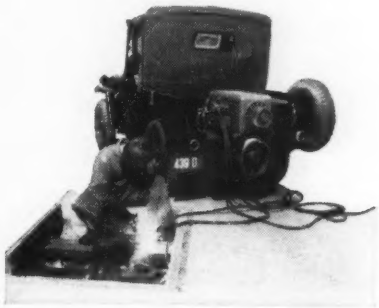


ing one man operation and fitting all standard size drums, the accessory is quickly fitted to and removed from existing lifting devices. Tilt locks hold the drum in vertical position and permits controlled tilting.

4. Jeep-Mounted Welder

Coupling of a standard P & H model WG-200 welding generator, made by Harnischfeger Corp., 4400 West National Ave., Milwaukee 14, Wis., to a Willys Jeep is announced by the arc welding manufacturer. Pulleys of the proper ratio, driven through the rear power take-off of the Jeep enable its engine to operate at 1500 revolutions per minute, sufficient to enable the welding generator to give peak performance. V-belts are used in the hookup.

The welding generator is mounted for easy removal, four bolts holding it in place. The model WG-200 generator provides a welding service

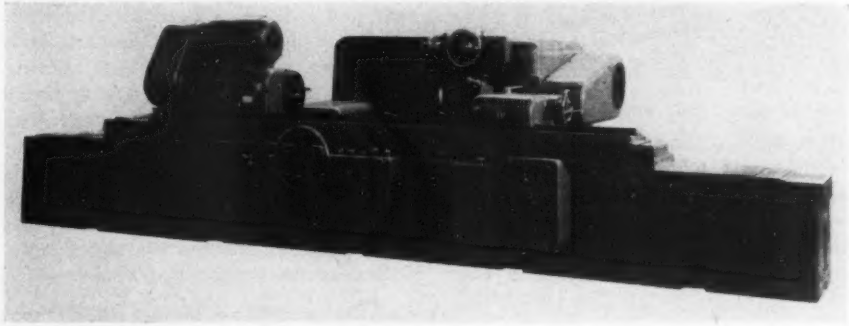


range of from 30 to 260 amperes and has one heat control for all classes of work and all types of electrodes.

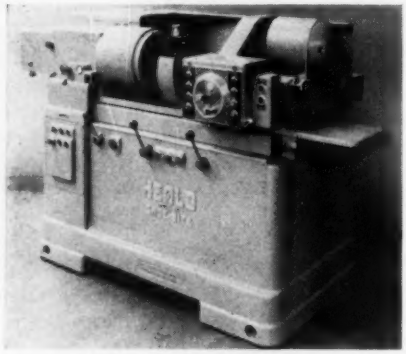
5. Internal Grinders

All elements of cross feed cycle and table speeds of the chuck type internal grinding machine models 271 and 371, made by Heald Machine Co., Worcester 6, Mass., are separately and quickly set for feed rates and amounts by individual graduated knobs. Designed for high production grinding of small to medium-large holes, these automatic sizing machines are offered in both Gage-Matic and Size-Matic models. Sizing by the former machine is by advancing the wheel a predetermined distance beyond the wheel truing position. The latter machine uses solid gages of required size which test the hole after each pass of the grinding wheel. Combination machines also are available.

Models 271 (illustrated) and 371 are the same except for size, the for-



mer having a maximum length of hole, a maximum and a minimum diameter of hole of 5 inches, 5 inches and ⅛-inch, while on the 371 they are 10 inches, 6 inches and ¼-inch. Table speeds are unlimited between



0 to 35 and 0 to 40 feet per minute on the two machines. Both are driven by a 1½-horsepower motor.

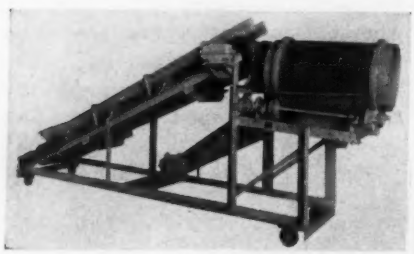
6. Sheet Bender

Flanged sheets up to 30 inches wide and 1/16-inch thick may be smoothly edge bended with the new single wing tangent bender model 30SW3, manufactured by Struthers Wells Corp., Titusville, Pa. Cabinets of sheet may be made in one piece wrap-around construction or in separate panels for compact shipment.

Extruded shapes, light structurals and tubing may be formed with the bender. No notching is required in most cases. Bends with a radii up to 3 inches can be made by the machine, one of nine models built by the company.

7. Magnetic Separator

Designed for the separation of core and molding sand for foundry use, the inclined magnetic pulley type separator, in combination with a revolving screen, made by Magnetic Engineer-

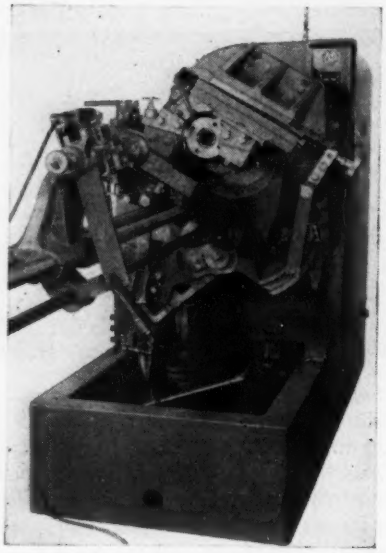


ing & Mfg. Co., Clifton, N. J., has other application in the separation of ferrous and nonferrous materials of aggregate sizes. Material to be separated is fed into the hopper at the low load end and passes to the inclined conveyor belt which carries it over the magnetic head pulley.

Magnetic material is attracted to the pulley, carried around to its underside and automatically discharged. Nonmagnetic material passes to the revolving screen where it is sized as required. Various screen sizes are available. The machine is portable, measuring 17 feet long, 30 inches high at the hopper end and 5 feet high at the discharge end.

8. Cut-Off Machine

Modern Machine Tool Co., Jackson, Mich., is announcing an automatic cutting-off machine for cutting tubing, pipe or solid bar stock, a machine which is similar in design to its manually operated machine. This machine



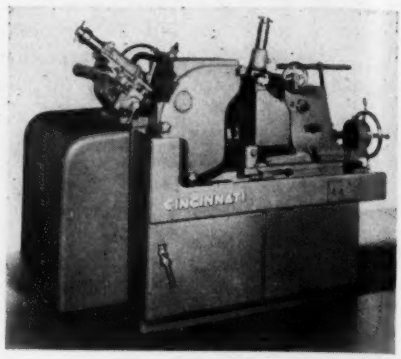
is heavier and has cross slides set at an angle for better chip clearance.

Double live roll stock feed will feed any length of stock through the spindle, and as the stock strikes the trip plate on the stop, it starts the automatic cycle. This cycle takes about 1½ seconds plus cutting time.

9. Centerless Grinder

Improved features promoting safety, lengthening the productive life span and facilitating set-ups are incorporated in the new model Filmatic No. 2 centerless grinding machine announced by Cincinnati Grinders Inc., Cincinnati 9, O. Units supporting the regulating wheel housing (upper and lower slide) are mounted on an intermediate plate which has a swivel adjustment through a trunnion mounting on the bed, facilitating set-ups, as it permits operator to swivel regulating wheel slides and quickly compensates for slight inaccuracies in truing the wheel.

Regulating wheel spindle is mounted on multi-shoe bearings. Electrical controls are built in, protected by a hinged cover at front of machine. Cover for grinding wheel guard is an aluminum casting, designed to ac-

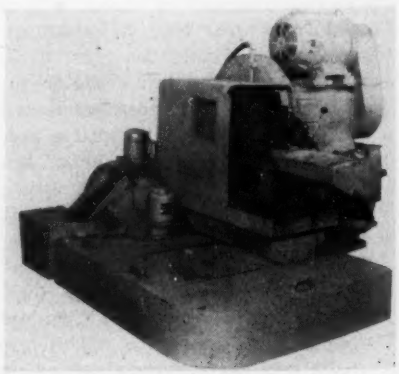


commodate crush dressers. Other design features include straight hydraulic grinding wheel truing, with arrangement for cam controlled profile truing. Twelve speeds from 12 to 300 revolutions per minute are available. Numerous attachments are built for the machine.

10. Disk Grinder

Semiautomatic operation, ample weight and rigidity and a low, wide horizontal work table which facilitates fixturing are features of the No. 526 26-inch disk grinder, built by Gardner Machine Co., Beloit, Wis., for grinding single flat surfaces to close tolerances. Grinding head is completely adjustable on a 3-point bearing, both horizontally and vertically, to any desired head setting.

Machine may be used for face and shear cutting. Head, mounted on ball bearing ways, moves laterally by

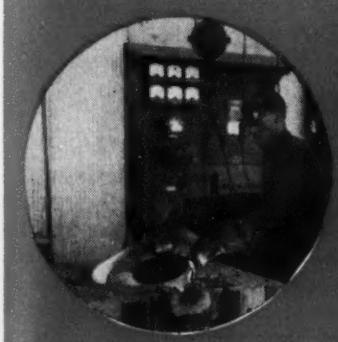


hand, or with air-draulic or hydraulic power. It is held against feed screw stop by adjustable spring pressure. Head in-feed screw may be turned by a hand wheel or by remote control, using an hydraulic or electric system. Sliding table has a full stroke of 14

(For more information, use the card following page 116.)

Generator Size Kw.	Furnace Size Lbs.	Steel Melting Performance		
		Approx. Time to Melt	Approx. Kw.-h. per Ton Overall	Approx. Lbs. per Hour
50*	50	25 min.	850	125
50*	100	50 min.	850	125
50*	150	75 min.	850	125
50*	200	1 hr. - 50 min.	850	125
100*	100	20 min.	800	300
100*	200	35 min.	800	300
100*	300	1 hour	800	300
100*	500	2 hours	825	300
175*	300	35 min.	750	500
175*	500	1 hr. 15 min.	750	500
175*	1000	2 hr. - 15 min.	775	450
250*	600	50 min.	700	750
250*	1000	1 hr. - 20 min.	700	750
350	600	35 min.	700	1000
350	1000	1 hour	700	1000
350	2000	2 hr. - 15 min.	725	900
700	1000	30 min.	675	2000
700	2000	1 hour	675	2000
700	4000	2 hr. - 15 min.	700	1800
1250	2000	30 min.	650	4000
1250	4000	1 hour	650	4000
1250	8000	2 hr. - 15 min.	675	3500

* 2 Bearing Motor Generator Sets.



IDEAL FOR SCRAP RECOVERY

Ajax-Northrup users report 95% recovery of chromium — nearly 100% of nickel. It's the most economical way to melt metals high in chromium, nickel, tungsten, cobalt and other highly oxidizable metals.

HOW SPEED PREVENTS LOSS IN STEEL MELTING

There's little time for oxidation with Ajax-Northrup melting. You get clean, quality steels and save the cost of expensive alloying elements.

Control is ideal—you hit pouring temperatures right on the nose. Carbon contamination is nil—one user reports carbon as low as 0.015% in stainless steels. It's flexible—install a battery of furnaces with different linings to handle any type of melt.

Ajax-Northrup melting is low-cost melting. One user melts nickel steels at half the overall cost of other types of furnaces, due to savings in deoxidizers and constituents.

CONSULT AJAX "KNOW HOW"

Ajax-Northrup provides the experience that has pioneered hundreds of unusual melting and heating problems for 30 years. Melting furnaces from 8 oz. to 8 tons. Heating coils for all applications.

102

AJAX NORTHRUP SINCE 1916

AJAX ELECTROTHERMIC CORP.
AJAX PARK, TRENTON 5, N. J.

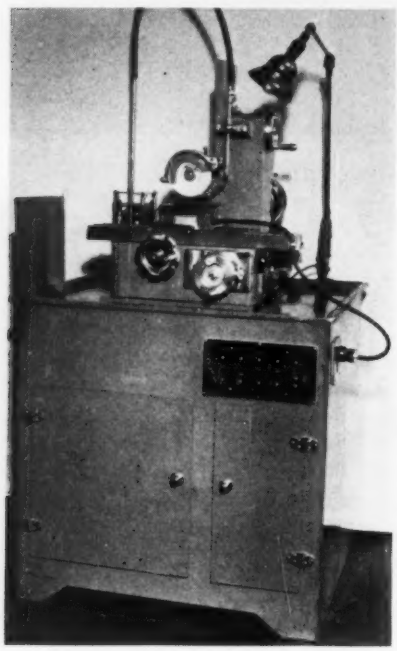
ASSOCIATE COMPANIES
AJAX METAL COMPANY • AJAX ELECTRIC CO., INC.
AJAX ELECTRIC FURNACE CORP. • AJAX ENGINEERING CORP.

HIGH-FREQUENCY HEATING-MELTING

inches and an oscillating stroke of 10 inches. Machine may be furnished either as a semiautomatic or automatic unit (except for loading and unloading).

11. Bench Grinder

Both repetitious production and the making of single pieces of the most complicated form grinding nature are possible with the new bench grinder made by Jacobsen Tool Co., 224 Glenwood Ave., Bloomfield 2, N. J. Spindle speeds may be varied from approximately 300 to 25,000 revolutions



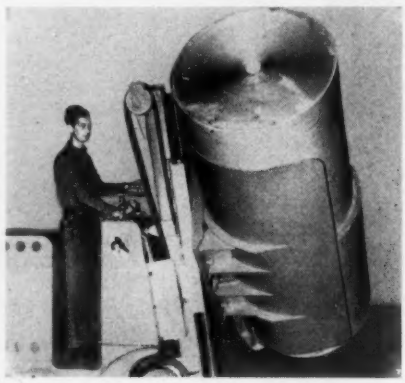
per minute with a set of six interchangeable pulleys.

Machines are mounted with sensitive indicators that register movements in fractions of 1/10 of a thousandth of an inch. Hand wheels are graduated with adjustable rings which operate against adjustable stops. Cross feed mechanism stops automatically at any given point. Gibs are self adjusting. Machine has a 4 x 6-inch magnetic chuck and a 6-inch clearance between top of chuck and bottom of a 5-inch wheel. Coolant tank is furnished.

12. Fork Truck Attachment

A hydraulically operated rotating carriage for installation on electric, gasoline or gas-electric power fork trucks made by Lewis-Shepard Products Inc., 291 Walnut St., Watertown 72, Mass., is announced by that company. It is designed compactly so that the load is kept close to the front wheels for maximum utilization of the inch-pound rating of the truck.

Attachments for the rotating carriage consist of a partial backplate,



toeplate and forks for handling paper rolls and conventional forks used in conjunction with a bin or dump box for picking up small castings, scrap metal, coal, etc.

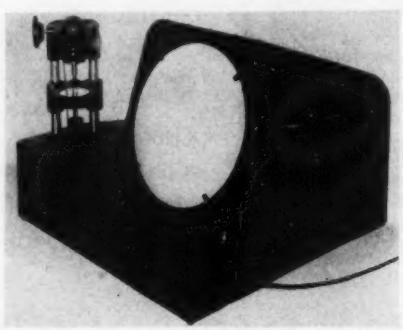
13. Electric Hoists

Capacities ranging from 250 to 2000 pounds may be handled by the Whippet line of electric hoists introduced by Ford Chain Block Division of American Chain & Cable Co., York, Pa. They may be furnished with trolleys, either parallel or cross mounted, with hook suspension or for rigid or bolt suspension.

Standard lift of the wire rope—equipped hoist is 12 feet, but a 20 foot lift may be specified. It is equipped with pushbutton control and grooved drum. Pull chain and handle supports pushbutton station and is used to pull hoist along runway beams.

14. Optical Comparator

An optical comparator suitable for continuous quantity inspection and the performance of delicate assembly operations on minute parts is the new

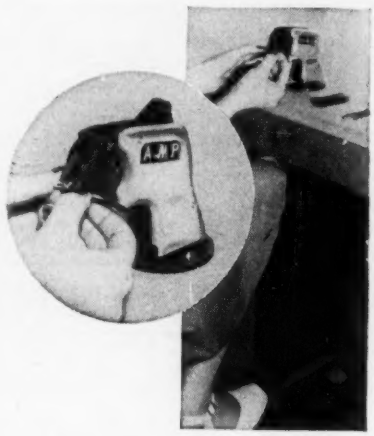


Wilder projector and optical comparator, marketed by George Scherr Co., 200 Lafayette St., New York 12, N. Y. To serve this dual purpose, both work stage and observation screen are close to each other, within operator's easy reach and line of vision, respectively.

Both stage and screen are entirely unobstructed. Overhead location of lamp-house results in a vertical beam of light and a horizontal work stage. When used for shadow images, a choice of six magnifications is given: 10, 20, 31¼, 50, 62½ and 100X. A surface illuminator for reflected images in 10 and 20X magnifications is available.

15. Foot Press

An efficient means of installing solderless wiring terminals is provided by the Ampli-press, an easily operated foot press announced by Aircraft-Marine Products Inc., 1597 North 4th St., Harrisburg, Pa. In-



terchangeable crimping jaws permit installation of a wide selection of terminal types.

Foot operation leaves both hands free to manipulate terminals and wire. Press requires only 7 square inches of bench area and may be set up quickly with a screwdriver, wrench and a 1/2-inch drill.

16. Casting Machine

An industrial injection machine for precision casting, developed by Simmon Casting Equipment Co., 21 West 30th St., New York 1, N. Y., has all controls placed within easy reach of the operator. Wax temperature is thermostatically regulated and wax is injected into the mold cavity in a plastic state, producing uniform patterns with no shrinkage.

Operation is mechanical and nozzle pressure is 1000 pounds per square inch. Mold size is 4 x 7 x 10 inches and average production is 60 shots per hour. Machine operates on 110 volts, alternating or direct current. It need not be shut down to refill wax chamber. New wax is fed continu-

(For more information, use the card following page 116.)

Instead of buying the plate and shaping it in your own plant, buy By-Products Steel Plate Shapes and save time and money!

Here's how: Just send us the drawing of the part you require and we'll quote on flame-cutting, shearing, pressing, blanking, bending or other shaping of the steel.

We have more than 150 major machines for prompt attention to your needs. By-Products has thousands of dies ready for use—can often save you the cost of new dies. And we can reduce your scrap losses—you pay no freight, no handling charges on scrap. Scrap allowance is made right at the mill where its value is highest.

Steel Plate Shapes are made from carbon, alloy and clad steels. Plate sizes range up to 195″ wide, or up to 25″ thick. Send for Bulletin No. 270. By-Products Steel Co., Division of Lukens Steel Company, 414 Strode Avenue, Coatesville, Pennsylvania.

LUKENS
BY-PRODUCTS STEEL DIVISION

BY-PRODUCTS STEEL CO.

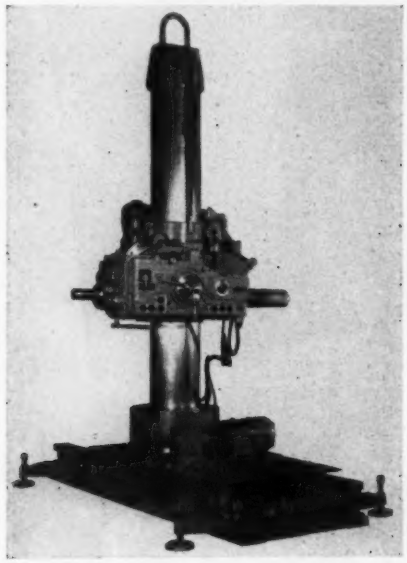
STEEL PLATE SHAPES

FLAME-CUT ★ SHEARED ★ PRESSED ★ BENT ★ BLANKED ★ WELDED

ously during operation. Mold clamp rotates to vertical position to accommodate all types of molds.

17. Drilling Machine

Three dimensional power traverse and swiveling of the headstock of the portable horizontal drilling and tapping machine, made by Kaukauna Machine Corp., Kaukauna, Wis., make



it possible to perform these operations throughout the range of 45 degrees above or below the horizontal spindle position. The machine can be placed in virtually any position for drilling and tapping the power elevation of headstock on column, the column and sub-base power traverse on the runway, the tilting of the head stock 45 degrees above and below the horizontal and the rotation of the column 360 degrees on its sub-base.

Designated as No. 1030, the machine has fine feed to spindle through micrometer handwheel, adjustable calibrated depth gage with automatic trip, single lever control for three feeds, selector switch for either right or left spindle rotation and full tapping cycle complete with each depression of pushbutton.

18. Fork Truck

Need for a small, light weight fork truck of 1000 pounds capacity is met by the type FQH-10 center control truck of Baker Industrial Truck Division of Baker-Raulang Co., 2168 West 25th St., Cleveland 13, O. It may be used in plants where narrow aisles, congested areas, limited floor capacity, small and low capacity elevators are a factor. Truck has a 36-inch wheelbase and an overall length, exclusive of forks, of 53-5/8 inches. It is 28 inches wide.

Including its load, its total weight is 3800 pounds. A travel controller provides three speeds forward and reverse. Controls are interlocked so that it may be started in low speed only. Battery has a capacity of 6.7 kilowatt hours and is ample for 12 hours of work.

19. Electric Tachometer

Weighing but 3 pounds, a new hand-held electric tachometer developed by General Electric Co., Schenectady 5, N. Y., is designed to give accurate and direct readings of linear speeds from 10 to 10,000 feet per minute and rotational speeds from 100 to 10,000

revolutions per minute. With accessories rotational speeds from 10 to 100,000 revolutions per minute may be measured.

Two units comprise the tachometer —the head, placed in contact with the moving object, and the indicating unit to which the head is attached by a flexible electric cable. Speed ranges may be changed while the spindle is rotating. Accurate speed indications are assured by a low driving torque of only 1/4-ounce-inch. Damage cannot result from overspeeding.

20. Plating Machine

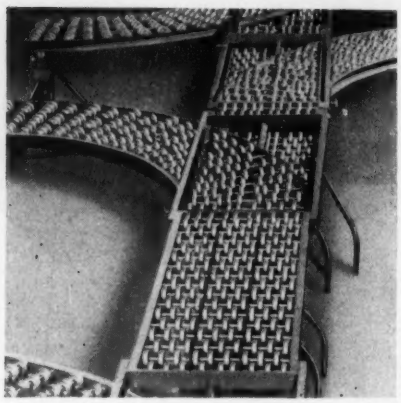
Two pneumatic cylinders furnish all the power needed by the Junior automatic plating machine announced by Udylite Corp., 1651 East Grand Blvd., Detroit 11, Mich., for plating shops which do not handle large volume operations. Machine has nine stations—electroclean, cold rinse, acid dip, cold rinse, plate, cold rinse, hot rinse, dry, load and unload—and will handle 75 to 100 racks per hour, depending upon speed of operation. Every phase of the cycle is adjustable.

Machine may be assembled and maintained by regular shop men because of its simplicity. Its overall length is 28 feet 6 inches. Rack size is 2 to 6 inches wide, 12 inches long, 24 inches deep. They are on 16 inch centers and anodes are on 18 inch centers. Average carrier speed is 1.6 to 2.2 feet per minute.

21. Conveyor Switch

Conveyor line efficiency is increased with the conveyor switch, made by Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y., to permit material to travel forward or to be diverted at 45 or 90 degrees. Pulling of a lock pin allows the center portion of the switch to swing on its own axis, permitting straight ahead or curved side of switch to be used.

Switch is of all-welded steel con-



struction and provides great strength with a minimum of weight. Units are made in standard widths and in special sizes.

22. Drill Press Feed

Made in two sizes for attachment to various drill presses, a pneumatic drill press feed, manufactured by Mead Specialties Co., 4114 North Knox Ave., Chicago 41, Ill., attaches in a few seconds and is offered with or without a fixture actuating valve. It has a single acting cylinder which multiplies air line pressure, a one-way speed control valve for drill speed regulation, constant air line connection and a split collar for attaching to spindle.

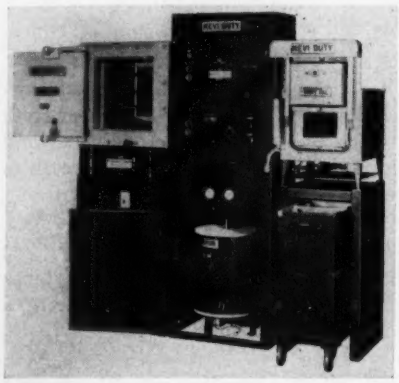
Feed No. 1 for 14 inch Delta, Buffalo, Atlas and similar presses has a bore of 2-9/32-inch (four times line pressure), a stroke of 2¼-inches and has a capacity of ⅜-inch in steel.

(For more information, use the card following page 116.)

Model No. 2 for Delta, Buffalo and other presses has a 3-inch bore (seven times line pressure), a 2-inch stroke and a capacity of ⅝-inch in steel.

23. Atmosphere Generator

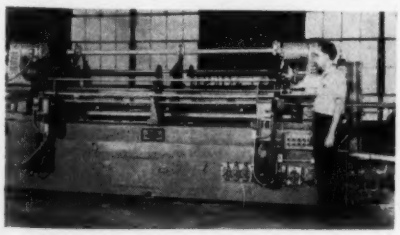
Consisting of an electrically heated vertical tube furnace in which a catalyst filled alldy retort is located, the Atmo-Gen small capacity atmosphere generator, made by Hevi Duty Electric Co., Milwaukee 1, Wis., may be used in connection with copper and silver brazing, non-decarburizing hardening, bright annealing, dry cyaniding, nitriding and sintering. The retort extends through each end of the furnace.



Ammonia gas is passed through the heated retort and cracked to form nitrogen and hydrogen. The carbon potential of the produced atmosphere is controlled by the addition of a hydrocarbon gas. Maximum operating temperature is 1850° F. Kilowatt rating is 2.8.

24. Profiling Machine

End-machining operations such as turning, boring, chamfering, burring, threading, tapping, etc., on ends of pipe, tubing, bars, fittings and other types of work may be carried out by the profiling machine built by Pines Engineering Co., 653 Walnut St., Aurora, Ill. Machines are built for either manual or fully automatic operation, the latter being equipped with hydraulic controls which repeat the machining sequence continuously.



Either one or two heads may be

Save *with* PRE-COATED THOMASTRIP

To increase production and establish cost-cutting methods, consider pre-coated ThomaStrip. Thomas Cold Rolled Strip Steel is plated with non-ferrous metals, or lacquer in colors.

Methods of saving with pre-coated ThomaStrip vary according to the product for which the steel is used. Manufacturers report savings through increased die life, more uniform coatings, eliminating investments in plating equipment and metal inventories, reducing handling, inventory, storage, and transportation within the plant. All this results in higher yields in production with substantial savings in finished product costs.

Pre-coated ThomaStrip is produced in electro-coated zinc, copper, nickel and brass, hot dipped tin and solder, and lacquer coated in colors.

Thomas Strip
COLD ROLLED STRIP STEEL
REG. U. S. PAT. OFF.

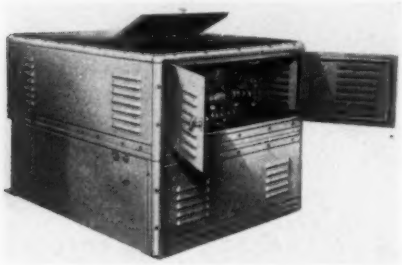
THE THOMAS STEEL CO. • WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS

used. Two heads permits simultaneous machining of both ends of the work. Machines may be set up to handle various lengths and diameters of work. Chute or magazine fed machines are used for maximum lengths up to 24 inches. Reel fed machines are used for lengths over 24 inches. They may be equipped with conveyors which carry the work to the machine and transport the finished pieces from the machine.

25. Hydraulic Power Units

Custom built hydraulic power units designed for special installation requirements are announced by Vickers Inc., 1480 Oakman Blvd., Detroit 32, Mich. They can be built to include all the necessary valves, pumps, oil, re-



servoirs, intermediate piping, motors, air cleaners, etc., in one self contained unit. Hydraulic connections to the machine are grouped in a conveniently located manifold.

Each unit is pretested and is ready for operation when connected to machine for which it was designed. Its components are easily accessible for making operating adjustments and for maintenance.

26. Polishing Machine

Developed for the polishing of rubber printing rollers on a production basis, a new lathe, made by R. K. LeBlond Machine Tool Co., Cincinnati 8, O., may also be used for standard engine lathe turning, being

readily adapted to regular metal working operations. Grinding action at 4125 revolutions per minute is obtained through a variable pitch drive which revolves the roller clockwise while a 2 horsepower, 2325 revolutions per minute grinder rotates in the opposite direction.

These Regal lathes are offered in six swing sizes from 13 to 24 inches, although the polishing machine is usually built on the 19 inch model which swings over the ways with beds any length starting at 6 feet. Machines are built with eight speed geared headstock, quick change box, leadscrew and feed rod, one piece apron with positive jaw feed clutch and one shot lubrication to apron.

DEVELOPED BY . . .

27. W. F. Meyers Co., Bedford, Ind., Meyco carbide-inserted drill jig bushings. A hardened steel ring above the top carbide ring protects both carbide and drill against shock of impact.

28. Eutectic Welding Alloys Corp., New York 13, N. Y., flux coated gas rod for welding all types of gray or alloy cast iron. Known as EutecRod 14 FC, it develops a tensile strength of 48,000 pounds per square inch, bonding at 950-1400°F.

29. Kennametal Inc., Latrobe, Pa. high temperature grade K138 tungsten carbide which is unaffected after heat at 2100°F for 48 hours when returned to room temperature. It must be fastened mechanically as it cannot be brazed satisfactorily.

30. Pneu-trol Devices Inc., Chicago 18, Ill., flow control valve for air or hydraulic cylinder speed control. It features unrestricted flow from the cylinder. It is made in three pipe sizes from brass and stainless steel.

31. Sangamon Electric Co., Springfield, Ill., type S compact time switch powered by a high torque, synchronous, self starting low speed motor.

32. Magnilastic Division of Cook Electric Co., Chicago, Ill., a line of anchor base expansion joint pipe fittings of stainless steel, made to withstand pressures from 30 inches of vacuum to 1000 pounds per square inch in various pipe sizes.

33. Shell Machine Co., Hazel Park, Mich., spiral grip, nonslip collets with serrated, nontracking gripping surfaces. Under extreme torque, they slip from one pyramid contact to the next which locks the stock instead of cutting grooves.

34. Harry W. Dietert Co., Detroit 4, Mich., Hi-Precision carbon determinator which with the addition of combustion gas cooler, insures gases in the burette at room temperature. Burettes are offered in several ranges for different metals.

35. Hanson & Co., Detroit 11, Mich., holding fixture, consisting of a base and two sliding mounting blocks, which between each grinding operation are stabilized through a deep-freeze procedure.

36. United States Gauge Division of American Machine & Metals Inc., Sellersville, Pa., sealed case dial indicator pressure gages which show absolute pressure in inches or millimeters of mercury in a number of ranges.

37. L. H. Gilmer Division of United States Rubber Co., New York 20, N. Y., a strong, highly flexible and virtually noiseless belt with rubber teeth which will not slip. Belt is reinforced with steel cables, reducing stretch to almost zero.

38. B. & S. Bronze Foundry Inc., Long Island City 1, N. Y., Hytenat nonheat-treated high tensile strength aluminum castings.

39. Metron Instrument Co., Denver 9, Colo., multiple range electric hand tachometers, accurate within 1 per cent. Operating ranges are 200-2000, 500-5000, 1000-10,000 (type 25A) and 20-200, 50-500, 100-1000 (type 25B).

40. Southwest Products Co., Pasadena 1, Calif., flexible, compression and tension type push-pull controls for manual remote control of mechanical, hydraulic or other devices. Made in light, heavy and extra duty models.

41. Whiton Machine Co., New London, Conn., an aluminum body chuck which enables machine operators to change chucks rapidly. Chuck, which has alloy steel jaws, mounts on American standard spindle nose type D-1.

42. General Electric Co., Schenectady 5, N. Y., an all-welded solenoid which develops a maximum pull of 0.26 pound in a ½-inch stroke. It operates on 110 volts, 60 cycles.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PRICES—Advances on selected iron and steel products, announced last week, are being accepted philosophically by consumers and are causing little disturbance in the market. Nails have been marked up $9 to $10 a ton and some producers are adopting the columnar system of quoting nail prices, with others expected to follow. Barbed wire is up $12 a ton, woven wire fence $9 a ton and bale ties $8. U. S. Steel Corp. subsidiaries have advanced galvanized sheets $2 a ton to bring prices in line with those quoted by other producers. Long ternes and enameling sheets similarly will be brought into line. Railroad specialties have been increased, tie plates and splice bars being up $12, axles $8, and wheels 7½ to 15 per cent. Pig iron prices advances, started more than a week ago, have become general. Tennessee Products Corp. has advanced charcoal pig iron $5 to $55, f.o.b. furnace, Lyles, Tenn.

Scrap prices are stronger, with a tendency noted in some districts to break through the formula of double the wartime ceiling price. In other centers, steelmakers are holding firm to the formula and threaten to close down furnaces before paying the higher prices asked for scrap.

SUPPLY-DEMAND—No improvement can be noted in achieving a balance of supply and demand despite production at the highest rate in several years. In fact, further stringency is noted in major products. The situation in sheet and strip, tubular products and plates is particularly acute, with hot carbon bars and shapes at least as scarce as ever.

Steelmaking capacity is nearly three million tons greater than a year ago, with substantial increases in blast furnace, coke oven and finishing capacity. Producers, however, are encountering difficulties in increasing operations due to the shortage of pig iron, scrap, fuel oil, coke and the shrinkage in natural gas supply due to weather conditions.

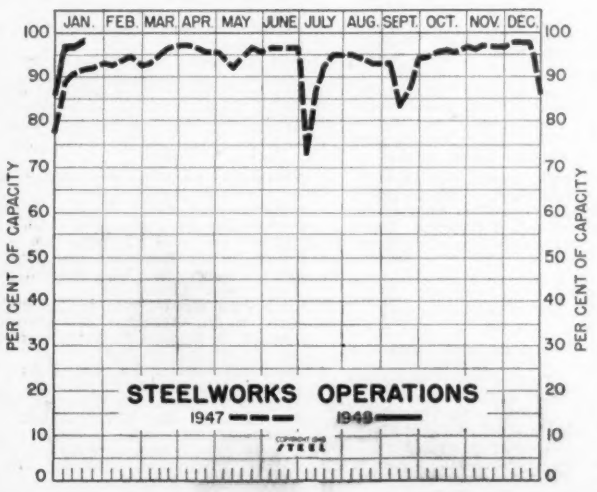
ALLOCATIONS—Steel consumers who pin their hopes for more steel on the voluntary allocations program now being set up probably are engaging in wishful thinking. The vast majority of metalworking companies will realize no easing in their procurement problems; many may find these problems more difficult due to diversion of steel to favored programs.

Belief is growing in some quarters that the national administration may yet win its demand for compulsory allocation, priorities and price control powers.

PRODUCTION—Steelmaking operations rose one point last week to 98 per cent of capacity, the highest level since May, 1944. The week's schedule was equivalent to production of about 1,715,000 tons, based on 1947 capacity figures, or the highest since May, 1945. Despite this high rate of operations, output would have been even higher had not some furnaces been forced to shut down due to metallics shortages.

Following gains were made in the various districts: 5 points to 91 per cent in Cincinnati, 3 points to 102 per cent in Birmingham, 3 points to 83 per cent in New England, 2 points to 91 per cent in Cleveland, 2 points to 95 per cent in Chicago, 1 point to 91 per cent in Detroit and 1 point to 88½ per cent in Buffalo. Operations in the eastern Pennsylvania district eased 2 points to 90 per cent.

PRICE COMPOSITES—Upward price trend is reflected in STEEL's price composites, with only semifinished holding unchanged, at $57.20. Finished steel averages rose from $78.05 to $78.18, reflecting primarily the advances in nails and wire products. Steelmaking pig iron advanced from $38.44 to $39.16. Steelmaking scrap moved up $1.84 to $41.92.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Jan. 17	Change	Same Week 1947	Same Week 1946
Pittsburgh	102	None	99	56.5
Chicago	95	+ 2	90	64
Eastern Pa.	90	— 2	85	78
Youngstown	93	None	85	65
Wheeling	93.5	None	89	93
Cleveland	91	+ 2	90.5	83
Buffalo	88.5	+ 1	90.5	23.5
Birmingham	102	+ 3	99	95
New England	83	+ 3	80	80
Cincinnati	91	+ 5	85	81
St. Louis	89.5	None	72.5	63
Detroit	91	+ 1	93	88
Estimated national rate	98	+ 1	91.5	70

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947-48; 1,762,381 net tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Jan. 17	Jan. 10	Month Ago Dec. 1947	Year Ago Jan. 1947	5 Years Ago Jan. 1943
Finished Steel	$78.18	$78.05	$76.15	$69.59	$56.73
Semifinished Steel	57.20	57.20	57.20	49.98	36.00
Steelmaking Pig Iron	39.16	38.44	36.31	29.56	23.00
Steelmaking Scrap	41.92	40.08	40.13	31.20	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Oct. 1947	3.45536c
Sept. 1947	3.45716c
Oct. 1946	2.86140c
Oct. 1942	2.37038c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Finished Steel arithmetical composite, dollars per net ton on net ton basis; others, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 81 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates; standard rails; hot- and cold-rolled carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Jan. 17, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.318	3.30	2.975
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.46
Shapes, del. Philadelphia	2.968	2.954	2.947	2.60
Shapes, Chicago	2.80	2.80	2.80	2.47
Plates, Pittsburgh	2.95	2.95	2.95	2.61
Plates, del. Philadelphia	3.19	3.17	3.16	2.77
Plates, Chicago	2.95	2.95	2.95	2.62
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.90	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.90	3.90	3.55
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.425
Wire nails, Pittsburgh	4.70	4.625	4.25	4.062
Tin plate, per base box, Pittsburgh	$6.70	$5.75	$5.75	$5.75

Semifinished Materials

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$47.60
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	41.40
Rerolling billets, Pittsburgh	47.50	47.50	47.50	41.40
Wire rod 7/32 to ¼-inch, Pitts.	3.05c	3.05c	2.925c	2.55c

Pig Iron

	Jan. 17, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$37.913	$37.879	$31.815
Basic, Valley	39.00	36.00	36.00	30.00
Basic, eastern del. Philadelphia	42.004	38.84	38.78	31.99
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	37.413	37.379	31.315
No. 2 fdry., del. Philadelphia	42.504	39.34	39.28	32.49
No. 2 foundry, Chicago	39.00	36.00	36.00	30.50
No. 2 Foundry, Valley	39.50	36.50	36.50	30.50
Southern No. 2, Birmingham	37.88	34.88	34.88	26.88
Southern, No. 2, del. Cincinnati	40.74	37.74	38.544	31.75
Malleable, Valley	39.50	36.50	36.50	30.50
Malleable, Chicago	39.50	36.50	36.50	30.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	50.00	46.40	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.50	$40.00	$39.90	$32.50
Heavy melt. steel, No. 2, E. Pa.	46.00	41.625	39.50	31.00
Heavy melt. steel, No. 1, Chicago	39.25	38.75	39.55	30.00
Heavy melt. steel, No. 1, Valley	40.25	39.75	39.50	32.56
Heavy melt. steel, No. 1, Cleveland	39.75	39.25	38.25	31.88
Heavy melt. steel, No. 1, Buffalo	43.50	42.50	39.00	30.88
Rails for rerolling, Chicago	60.00	58.625	51.00	36.25
No. 1 cast, Chicago	63.50	55.875	46.40	41.50

Coke

Connellsville, beehive furnace	$12.50	$12.25	$12.15	$8.81
Connellsville, beehive foundry	14.50	14.50	14.50	9.81
Chicago, oven foundry, del.	19.10	18.60	18.52	15.95

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-58; Detroit, del., $61.20; eastern Mich., $62.60.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69.20, eastern Mich., $70.60.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $66 to $92.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to ½-in., inclusive, $2.80-3.30 per 100 lb. 7/32 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.351c; Phila., del., 3.356c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.46c; eastern Mich., 3.53c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.26c; eastern Mich., 4.33c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

†Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; eastern Mich., del., 3.78c; New York, del., 4.001c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. **Armature:** Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. **Electrical:** Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. **Motor:** Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. **Dynamo:** Pittsburgh, 6.75c; Granite City, 6.85c. **Transformer 72,** 7.25c; **65,** 7.95c; **58,** 8.65c; **52,** 9.45c, Pittsburgh.

Strip

Hot Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del. 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.55 to 0.70 lb tin, $5.20; 0.75 to 0.95 lb tin, $5.10; 100 to 128 lb tin, $5.20.

Hollowware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.40c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del. 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del. 3.269c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa. 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 443, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	**$3.55-3.80
Spring (except Birmingham)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality	
Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails	
Standard and cement-coated	‡94
Galvanized	§94
Staples, polished and galvanized	‡‡94
Woven fence, 15 gage and heavier	100
Barbed wire, 80-rod spool	113
Fence Posts (with clamps)	107
Bale ties, single loop	99

** Worcester, $3.65, Duluth, $3.60, base, San Francisco (base, del.), $4.56, bright basic only.

† Worcester $4.70, Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

‡ Worcester 100; San Francisco (base, del.) 115.

§ Worcester 100; San Francisco (base, del.) 115.

‡‡ Worcester 100; San Francisco (base, del.) 115.

†† Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed, $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.

Rails, Supplies

Rails: Standard, over 60-lb top mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 on on 25,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller	46 off	....
⅛-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅛-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅜ and smaller x 6 and shorter	48 off
⅝, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
½-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl **$1-$2 off**

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Baltimore, del.	....	44.32	....	....
Cincinnati, del.	....	40.74	....	....
Newark, N. J., del.	....	42.328	....	....
Philadelphia, del.	....	42.124	....	....
St. Louis, del.	....	40.77	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.33	40.83	....	....
‡Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $2 higher for No. 2 foundry and malleable and $1.50 higher for basic at Buffalo, and 75c higher at Cleveland, effective on shipments during week ended Jan. 18.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$47.50
6.51-7.00..$48.75 9.01- 9.50. 55.00
7.01-7.50.. 50.00 9.51-10.00. 56.25
7.51-8.00.. 51.25 10.01-10.50. 57.50
8.01-8.50.. 52.50 10.51-11.00. 58.75
8.51-9.00.. 53.75 11.01-11.50. 60.00

Fob Jackson, O., per gross ton; Buffalo base $3.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn...$55.00

(For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.10
Terre Haute, del.	18.05
Milwaukee, ovens	18.75
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	17.50
Cincinnati, del.	18.10
Ironton, O., ovens	16.00
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	19.85
Detroit, del.	19.35
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	16.25
Pittsburgh, del.	18.21

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	19.00†
Toluol, two degrees	23.00
Industrial xylol	25.00
Solvent naphtha	25.00

Per pound fob works

Phenol (car lots, returnable drums)	12.00
Do., less than carlots	12.75
Do., tank cars	11.00

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$35.00

†Freight allowed up to 2 cents.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	70.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	39.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

†Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅝"–¾"	Floor ⅝" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
New York (city)	4.96	6.18	5.88	6.16	7.41	5.59	....	5.08	5.63	7.23	4.78	5.11	6.82
New York (country)	4.81	6.03	5.73	6.01	7.26	5.44	....	4.93	....	....	4.63	4.96	6.67
Philadelphia (city)	4.71	6.33	5.93	5.91	7.16	4.83	5.73	4.88	5.58	7.17[9]	4.57	4.86	6.33
Philadelphia (country)	4.61	6.23	5.83	....	....	4.73	5.63	4.78	....	....	4.47	4.76	6.23
Baltimore (city)	4.33†	5.96	5.66	5.73	6.98	4.81	....	4.86	5.56	....	4.73	4.78	6.31
Baltimore (country)	4.23†	5.86	5.56	5.50	6.75	4.71	....	4.76	....	....	4.63	4.68	6.21
Washington (city)	4.81	....	....	....	....	5.05	....	5.14	5.79[12]	....	4.95	5.03	6.60
Washington (country)	4.71	....	....	....	....	4.95	....	5.04	....	....	4.85	4.93	6.50
Norfolk, Va.	4.90	....	....	....	....	....	....	5.20	6.00	....	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	....	6.37	....	5.02[20]	....	4.97[20]	5.87	....	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	....	6.27	....	4.92[20]	....	4.87[20]	5.77	....	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	....	5.20[4]	6.00	....	4.70	5.65	4.40	5.10	6.65	4.40	4.95	6.20
Buffalo (country)	4.30	....	5.05[5]	5.55	....	4.25	5.50	4.25	4.95	6.65	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.10[4]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	....	4.95[5]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[5]	5.20[5]	5.81	7.06	4.55	5.35	4.40	5.10	6.85	4.68	4.60	6.18
Cleveland (country)	4.30	5.35[5]	5.05[5]	....	....	....	5.20	4.25	4.95	....	....	4.45	....
Cincinnati	4.671	5.516[5]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[5]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[5]	5.20[5]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.80	6.05
Chicago (country)	4.30	5.35[5]	5.05[5]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[5]	5.408[5]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[9]	5.53[9]	6.02	7.27	4.68	5.82	4.73	5.47[12]	....	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	....	....	5.65	....	4.45[20]	....	4.40[20]	5.93[23]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]††	6.29[11]	....	5.03[20]††	5.33[20]	7.29[20]
Omaha, Nebr.	5.462	....	....	6.662	7.912	5.362	....	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[13]	7.70	5.85	5.35	6.50
Los Angeles (city)	5.75	7.75[5]	7.45[5]	7.40	8.80	6.05	8.70	5.50	7.35[23]	9.35[16]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[5]	7.30[5]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[16]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[5]	....	6.85[5]	7.75[5]	5.75[21]	8.70[13]	5.05[21]	7.00[13]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[4]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[13]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]§§	....	7.10[4]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [23]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10 % C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si, carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si, carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low - Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb of briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l., bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Secondary Aluminum, Brass Ingot Prices Rise

Undertone of major primary markets remains firm with advance in zinc expected

NEW YORK — Advances of 1/4-cent to 3/4-cent a pound in secondary aluminum ingots and of 1/2-cent to 1-1/2 cents a pound in brass and bronze ingots featured recent developments in nonferrous metals. Up to late last week, leading producers had not posted higher prices for slab zinc, although such a move appeared imminent.

COPPER — Deliveries of copper to domestic consumers increased some 7200 tons in December to 113,446 tons, making total 1947 deliveries 1,388,666 tons. Production of copper from primary sources increased about 8400 tons last month to 73,382 tons while output from secondary sources held steady at 7211 tons. Refinery output showed an increase of 11,300 tons to a total of 108,816 tons. Stocks of refined copper at the end of December showed an increase of 8210 tons to a total of 74,832 tons.

Prices held unchanged in the domestic market at 21.50c, Connecticut Valley, for electrolytic.

BRASS AND BRONZE INGOTS—Brass and bronze ingot producers advanced prices, effective as of Jan. 9, as follows: 85-5-5-5, 80-10-10 and the yellow ingot groups, 1-1/2 cents; the nickel alloys and the aluminum and silicon bronzes, 1-cent; and the 88-10-2 and the manganese bronze groups, 1/2-cent. The advance was attributed by sellers to the recent uptrend in scrap prices. Furthermore, the advance narrows the differentials from virgin metal mixtures to more normal levels.

LEAD — Total stocks of lead held by smelters and refiners declined 11,800 tons to 134,252 tons as of Dec. 1. Imports of refined lead increased 3862 tons in November to a total of 14,285 tons, of which the bulk came from Canada and Mexico.

Output of refined lead from domestic ore in 1947 is estimated at 340,000 tons against 293,309 in 1946.

Supplies in the domestic market remain tight with sellers allocating February tonnages to customers at 14.80c to 14.85c, St. Louis.

ZINC — Consensus in the domestic zinc market still holds that higher prices may be posted soon by producers. The overall supply situation remains tight with most sellers carrying little physical metal. Scattered business was done last week on the basis of 10.50c, East St. Louis, for prime western, although most sellers are now quoting on an average monthly price basis. Domestic deliveries of slab zinc increased about 2100 tons to 61,258 tons in December while export and drawback shipments eased slightly to 7970 tons and withdrawals from the supply held by OMR and transferred to permanent stockpile totaled 2923 tons, making total shipments and withdrawals of 72,151 tons. Total smelter production for December amounted to 70,996 tons. Unfilled orders on producers' books at the end of December increased about 16,500 tons to 59,705 tons. Stocks at the end of the year amounted to 68,011 tons, the smallest recorded since the end of 1942.

TIN—Combined Tin Committee has made interim allocations for the first half of 1948, amounting to 17,703 tons and indicating that final allocations for that period will fall below those for the second half of last year. Of the total interim allocations, the United States received 10,200 tons. Prices were firm at 94.00c for Straits.

ALUMINUM — Smelters of remelt aluminum ingot advanced prices last week as follows: Foundry grades, from 1/4-cent to 3/4-cent a pound; steel grades, from 1/4-cent to 1 cent a pound, with some sellers' prices on Grades 1 and 2 about 1 cent a pound higher than those quoted by others. Producers are well booked over the next 60 days.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.75-20.50c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.50; No. 1 yellow (No. 405) 15.75-17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 16.00-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.75-16.75c; grade 2 (92-95%) 15.25-16.25c; grade 3 (90-92%) 15.00-15.75c; grade 4 (85-90%) 14.25-15.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, 20.50c per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.44c; nickel silver, 18%, 42.29c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.95c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.75, No. 2 copper 17.75, light copper 16.75, composition red brass 15.50, auto radiators 12.50, heavy yellow brass 11.25, brass pipe 12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.00, No. 2 copper 18.00, light copper, 17.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50-17.00, No. 2 15.50-16.00, light copper 14.50, No. 1 composition red brass 12.00-12.50, No. 1 composition turnings 11.50, mixed brass turnings 8.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.00-10.50, light brass 6.00-6.50, heavy yellow brass 8.25-8.50, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.50-9.75, cocks and faucets 9.50-9.75, brass pipe 9.25-9.50.

Lead: Heavy 12.00, battery plates 6.75-7.00, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 12.50-13.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.00-5.25; new die cast scrap 4.50-5.00, old die cast scrap 2.50-3.00.

Tin: No. 1 pewter 55.00-57.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings, 2S 8.50-9.00, old sheets 6.50-7.00, crankcases 6.50-7.00, borings and turnings 2.00-2.50, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. Average	21.50	14.825	10.50	85.704	15.00	33.00	35.00	74.625
Jan. 1-15	21.50	14.80-14.85	10.50	94.00	15.00	33.00	35.00	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busneling	40.50
Nos. 1, 2 and 3 Bundles	40.50
Machine Shop Turnings	35.50-36.50
Mixed Borings, Turnings	35.50-36.50
Short Shovel Turnings.	36.50-37.50
Cast Iron Borings	37.00-37.50
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	58.00-59.00
Charging Box Cast	45.00-47.00
Heavy Breakable Cast.	43.00-45.00
Unstripped Motor Blocks	50.00-51.00
Malleable	69.00-70.00
Brake Shoe	50.50-51.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00
R.R. Malleable	69.00-70.00
Axles	51.50-52.00
Rails, Rerolling	54.50-55.00
Rails, Random Lengths	52.50-53.00
Rails, 3 ft and under	54.00-54.50
Rails, 18 in. and under	55.00-55.50
Railroad Specialties	53.50-54.50
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	52.50-54.50

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	62.00-65.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast.	58.00-60.00
Unstripped Motor Blocks	58.00-59.00
Malleable	70.00-75.00
Brake Shoes	54.00-55.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	60.00-61.00
Burnt Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	70.00-75.00
Rails, Rerolling	60.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	63.00-65.00
Cast Steel	58.00-60.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	61.00-62.00

* Earmarked material; open market price $48.50-$49.50.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	48.50-49.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt	40.50-41.50*

* Earmarked for return to steel supplier. Price in open market, $48.50-$49.50.

MANSFIELD

Machine Shop Turnings	37.00-38.00
Short Shovel Turnings.	37.00-38.00

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	68.00
Rails, Rerolling	58.00
Rails, Random Lengths	56.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	41.00-41.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast.	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.50-44.50
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Busheling	41.50-42.00
No. 1 & 2 Bundles	41.50-42.00
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Low Phos.	47.00-48.00
Elec. Furnace Bundles.	44.00-45.00

Cast Iron Grades

No. 1 Cupola	58.00-60.00
Mixed Cupola	54.00-56.00
Heavy Breakable Cast.	51.00-52.00
Malleable	70.00-75.00
No. 1 Wheels	52.00-54.00
Clean Auto Cast	58.00-60.00

Railroad Scrap

Rails, 3 ft. and under.	50.00-52.00
Railroad Specialties	49.00-51.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$46.00
No. 2 Heavy Melt. Steel	41.00-42.00*
No. 1 Busheling	41.00-42.00*
No. 1, No. 2 Bundles	41.00-42.00*
No. 3 Bundles	39.00-40.00*
Machine Shop Turnings	34.50-35.50
Mixed Borings, Turnings	34.50-35.50
Short Shovel Turnings.	36.00-37.00
Bar Crop and Plate	47.50
Punchings & Plate Scrap	47.50
Cut Structurals	47.50
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	41.50-42.50

Cast Iron Grades

No. 1 Cupola Cast	54.00-55.00
No. 1 Machinery Cast.	56.00-58.00
Charging Box Cast	54.00-55.00
Heavy Breakable Cast.	54.00-55.00
Unstripped Motor Blocks	47.50-48.50
Malleable	66.00-68.00
Clean Auto Cast	55.00-56.00
No. 1 Wheels	58.00

* Nominal.

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	34.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	31.00-32.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
Charging Box Cast	50.00-51.00
Heavy Breakable	49.00-50.00
Unstripped Motor Blocks	46.50-47.50
Malleable	58.00-60.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings.	28.50-29.50
Bar Crops and Plate	33.00-34.00
Punchings & Plate Scrap	33.00-34.00
Chemical Borings	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	46.00-47.00
Charging Box Cast	40.00-41.00
Heavy Breakable Cast.	47.00-48.00
Stove Plate	46.00-47.00
Unstripped Motor Blocks	41.00-42.00
Clean Auto Cast	44.00-45.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
Nos. 1 & 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	45.00-45.50
Punchings	50.00-50.50
Elec. Furnace Bundles.	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	62.00-65.00
Clean Auto Cast	62.00-65.00
No. 1 Wheels	50.00-53.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	48.00-48.50
Malleable	72.00-74.00
Rails, Rerolling	59.00-61.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	57.00-58.00
Angles, Splice Bars	61.00-62.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings.	33.00-34.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	55.00-60.00
Mixed Cast	54.00-56.00
Heavy Breakable Cast.	43.00-45.00
Brake Shoes	46.00-47.00
Clean Auto Cast	56.00-61.00
Burnt Cast	47.00-49.00

Railroad Scrap

R.R. Malleable	62.00-63.50
Rails, Rerolling	58.00-61.00
Rails, Random Lengths	53.00-55.00
Rails, 3 ft and under	56.00-58.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	37.50-38.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

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3126 W. Burleigh St. Milwaukee, Wisconsin

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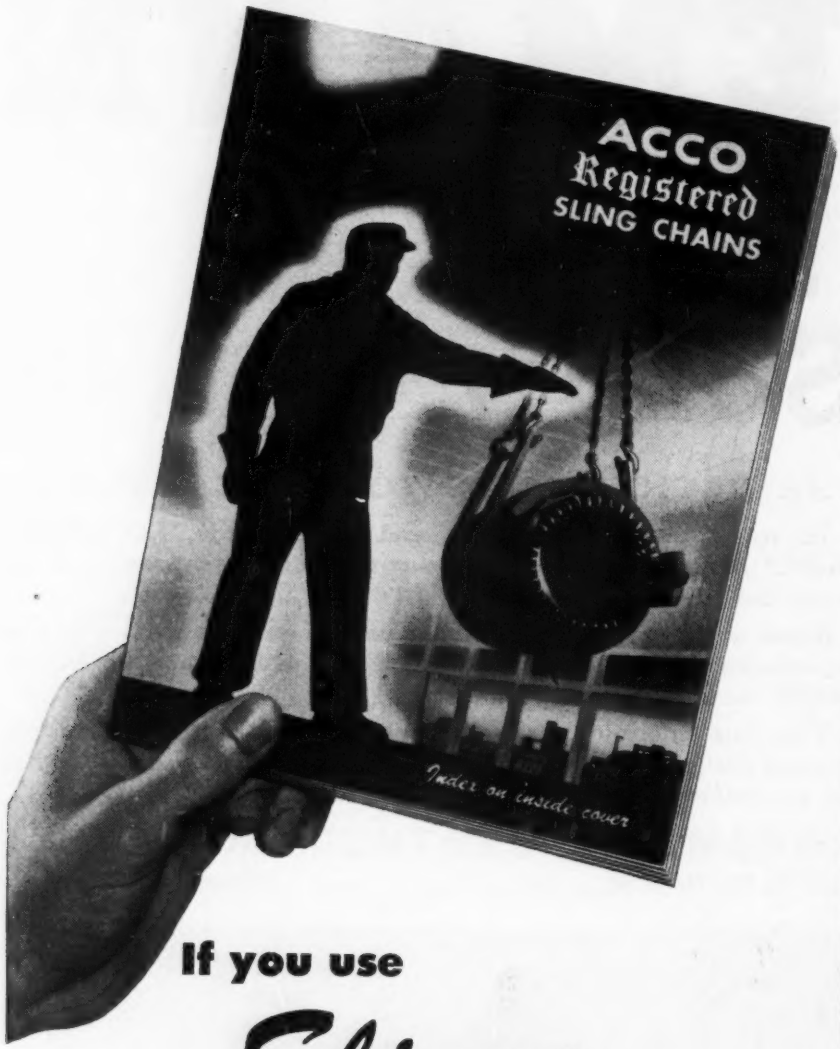

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THIS New 28-PAGE BOOK tells what you need to know about sling chains in general—ACCO REGISTERED SLING CHAINS in particular. For example, on page 3 you'll find 7 points you should consider when ordering sling chains. The rest of the book gives you complete information that will help you select the right sling chain for your particular needs.

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TRADE MARK

In Business for Your Safety

Sheets, Strip . . .

Galvanized sheet prices advanced by Carnegie to eliminate market spread

Sheet Prices, Page 120

Pittsburgh — Carnegie-Illinois Steel Corp. increased all its galvanized sheet products $2 per ton Jan. 12, bringing quotations in line with those of other producers. Since last August the company has been selling below its competitors. This price action involved no revisions in extras. Increase raised galvanized sheets to $3.95 per 100 lb, 10 gage, fob Pittsburgh, Chicago and Gary; corrugated galvanized to $4.05; culvert sheets to $4.55. It is indicated similar price action may be taken by Carnegie early this week on long ternes and on enameling sheets.

Jones & Laughlin Steel Corp. has issued a new extra card on cold-rolled carbon sheets, bringing up to date the extra changes made within the industry since issuance of its previous list on May 17.

Boston — There is slight evidence the supply of flat-rolled steel, sheets and strip, will be materially improved for the second quarter. Many producers are not making the progress expected in reducing carryovers, narrow strip cold mills being forced to revise schedules frequently by uneven hot-strip inventory. Substitutions increase for flat-rolled items. At the same time, slightly more gray iron tonnage is appearing.

New York — Hot, cold-rolled and gavanized sheets are moving into the district at a fairly sustained rate, although against commitments scheduled for delivery before the turn of the year. It will probably be another two or three weeks before the bulk of these arrearages have been handled. Meanwhile, most consumers, while concerned as to the eventual effect of the proposed allocation program, do not expect it to have much influence before the second quarter. Stainless and certain specialties continue in easy supply.

Cincinnati—Strong pressure, after the holiday respite, is again on sheet mills for tonnage, as fabricators seek larger first quarter allotments than assigned and initiate early requests for second quarter positions. Other district interests have not followed a Newport mill in the increase of $10 a ton on galvanized and long ternes. Production is being maintained at peak levels.

Birmingham — Reports of pending increases in sheet prices are heard here although there has been no official word on the subject thus far and most observers are inclined to discount the likelihood, at least for the present. Sheets have regained the fractional loss in demand reported in the district last week. Result is that supplies continue to lag considerably behind current needs. Strip production, consisting mainly of barrel hoops and cotton ties, is generally sufficient for needs.

St. Louis—Sheet and strip production here remains unchanged, with Granite City Steel Co.'s new cold mill holding to a 25 per cent test pace. Pickle line difficulties are holding down operations.

Steel Bars . . .

Bar Prices, Page 120

New York — The situation in hot carbon bars seems to worsen rather than improve, and already some producers, particularly those who have had some production difficulties of late, are warning their customers that they may not be able to move as much tonnage against new commitments as they had anticipated at the time first quarter quotas were set up. At least one large seller, who originally believed that he would be caught up on arrearages by early February, believes that it will now be some time in March, unofficial labor troubles having set him back rather badly at one producing unit.

Cold-drawn carbon bars, while in tighter supply, are nevertheless still available against new orders for shipment in this quarter, and alloy bars, both hot and cold, can be had within five to six weeks.

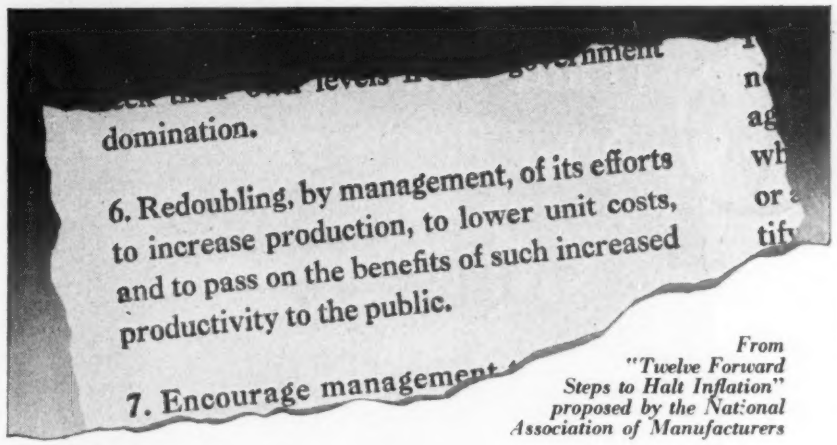
St. Louis—Merchant bar demand continues with unremitting pressure, although some consumers are reported slackening their manufacturing seasonally. Moreover, there is little indication of inventory-building, with the exception of firms using a variety of products who find their operations stymied by a bottleneck in one or two. Barmakers are six months behind on orders even though they have rejected most new ones for the last several months. Deliveries will worsen as the railroad car program takes more bars. Some customers already complain they are being cut painfully. Demand is exceptionally heavy for bars one and a half inch and smaller; in general, the smaller, the tighter. Railroads particularly, with their need for quarter and 3/8-in. bars for rivets and grabirons, heighten the demand. Concrete bars are available in 30 days.

Seattle—Rolling mills are again at peak operation after some holiday interruption. Demand for both reinforcing and merchant bars continued unabated and producers are making every effort to accommodate regular customers. Demand exceeds production and backlogs extend far into the year. Northwest Steel Rolling Mills, Seattle, is confining operations to reinforcing and plain round bars, the latter being absorbed largely by bolt and rivet plants. Flats and angles are no longer being rolled.

Tin Plate . . .

Tin Plate Prices, Page 121

Pittsburgh—Objective of imposing restrictions on use of tin plate for beer and possibly other items such as coffee and oil containers may be lost to some extent unless pending controls on steel distribution involve all products. Issuance of the container order has been held up pending the working out of an acceptable pattern among packers and other interested parties. Most sellers have entered 1948 with relatively little tin plate carryover tonnage on their books, while output to date this winter continues at practical capacity. Trend toward greater use of electrolytic, black plate and bonderized is indicated throughout the coming months, as result of pending revision in the container order.


domination.
6. Redoubling, by management, of its efforts to increase production, to lower unit costs, and to pass on the benefits of such increased productivity to the public.
7. Encourage management

From "Twelve Forward Steps to Halt Inflation" proposed by the National Association of Manufacturers

Here, indeed, is an able, statesmanlike proposal . . .

the N.A.M.'s 12-point program; and Step 6 in particular is a statement of both valid duty and brilliant opportunity—a call not merely to plan wisely but to "do something about it!"

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AND INDUSTRIAL TOWING TRACTORS

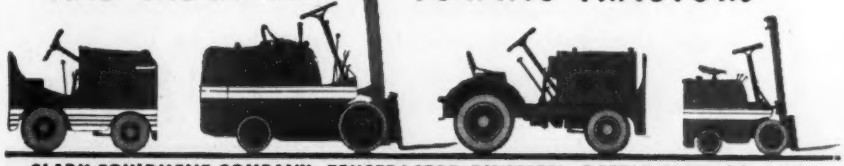

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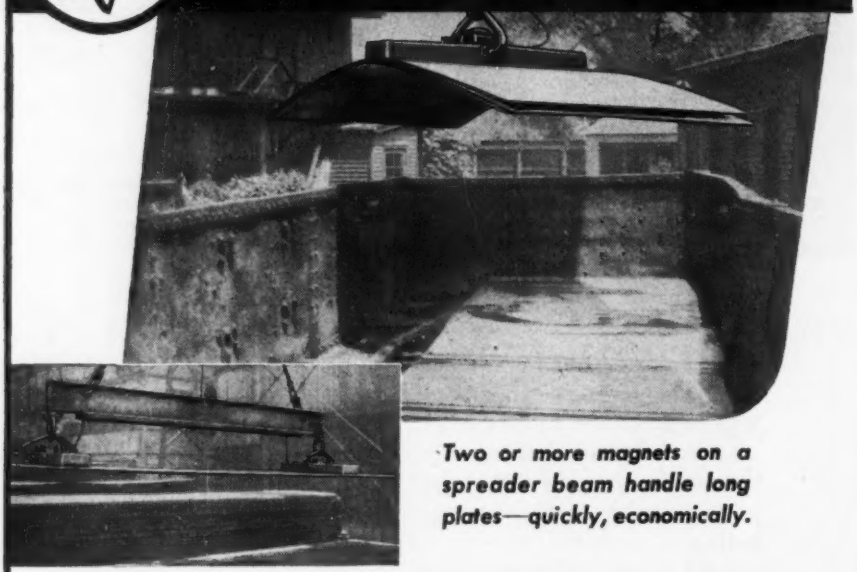
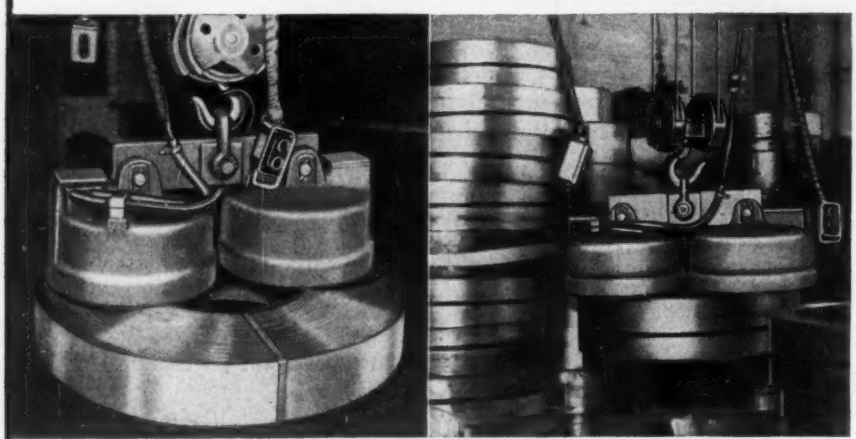
Plate-Handling Magnets
Speed Handling • Cut Costs



Two or more magnets on a spreader beam handle long plates—quickly, economically.

● Unload railroad cars quickly—no prying with crowbar—no chains to slip. (Top view.)

● Take plates from storage for processing. (Upper left.)



Coil-Handling Magnets also Make Savings

● Pile incoming shipments in coil storage. High piling reduces storage area. (Left view.)

● Remove coils from storage for processing—remove single coils without disturbing adjacent piles. (Right view.)

For prompt, complete recommendations on your specific plate or coil handling problem, please advise (1) Style and capacity of crane (2) Voltage available (magnets operate on direct current) (3) Shape, thickness and weight of material to be handled. Bulletins 903 and 904 will accompany the reply and show money-saving methods of operation under similar conditions.

THE ELECTRIC CONTROLLER & MFG. CO.
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Plates . . .

Plate Prices, Page 121

Harrisburg — Central Iron & Steel Co., subsidiary of Barium Steel Corp., has increased its price for steel plates $6 a ton to the basis of $95 a ton, or $4.75 per 100 pounds.

Pittsburgh—Revision in producers' customer allotments this quarter, due in part to mill carryover tonnage, is adversely affecting operating schedules of some plate fabricators here; and still additional cut-back in allotments is expected next quarter resulting from the Marshall Plan and possible increase in freight car construction program.

New York — While most plate consumers are concerned over application of the proposed voluntary allocation program now being formulated in Washington, they doubt that it will have much bearing on shipments for at least another two or three months. In fact, they doubt it will have any bearing at all in the current quarter. Meanwhile, shipments are coming through in fair volume although mostly against orders originally scheduled for delivery before the turn of the year. In practically all cases buyers are receiving far less than they could use. One eastern producer plans to suspend operations at one unit for repairs, with a result that his customers will receive far less tonnage in February than originally set up under first quarter quotas.

Philadelphia—Plate mills are being deluged with inquiry, despite the fact they are accepting no more plain plate tonnage for first quarter delivery and have not opened books for the second period. In fact some producers declare they will be unable to supply all the tonnage originally promised for this quarter, due principally to continued shortage of metallics, a tightening in supplies of fuel oil, and in the case of one unit at Sparrows Point, Md., a suspension for three weeks or so for repairs.

Chicago — Steel plate fabricators report the tonnage of plates which they are allotted by platemakers is inadequate to meet their needs, neither can they see much chance for improvement in the foreseeable future. As a matter of fact, they fear that the voluntary allocation plan being worked out by mills and government for essential industries may still further reduce plate quotas. For the past year, channeling of plates to the building of freight cars has restricted the supply of plates and is a good example of what can happen to general consumers. Carnegie-Illinois Steel Corp. has increased its price of I-beam lock flooring 15 per cent

Seattle—Plates continue scarce and plants are handicapped in bidding. There is a steady run of jobs involving small tonnages and order backlogs are fairly substantial.

Tubular Goods . . .

Tubular Goods Prices, Page 121

Seattle—Outlook for cast iron pipe is favorable although slow deliveries are a severe handicap and have diverted some business to other types of material. The potential demand for pipe is strong and several important projects are expected to be up for bids in the immediate future.

Wire . . .

Wire Prices, Page 121

Cleveland—American Steel & Wire Co., a subsidiary of United States Steel Corp., announced price advances on nails and fence items effective Jan. 8. The company also has adopted the column method of quoting nail prices. This replaces the dollars-and-cents system. For some time the column system has been used in pricing fence. Other leading producers are expected to adopt the column pricing system on nails soon. The column pricing procedure on nails (except non-standard items not stocked), as initiated by American Steel & Wire late last year, established column 85 as representative of base plus extras, with a 3-point discount, or usual 15 cents per 100 pounds, to jobbers but eliminated the regular 10 per cent discount on extras to jobbers. Some adjustments in extras also are incorporated in this column pricing method among the specialty nails and in smaller size classifications. American Steel & Wire now quotes nail prices as column 94, or approximately $94 a ton. Previously, the price was $85. Advances per ton in other items were $8 on bale ties, $12 on barbed wire and $9 on woven wire fence.

Pittsburgh—Jones & Laughlin Steel Corp. raised all nail items 50 cents a keg to $4.75 per 100-pound base, effective Jan. 12. This action included the elimination of the 25 cents per 100-pound differential in base prices between galvanized and standard nails and a reduction in the galvanizing extra from $2.75 to $2.50 for 15 gage and coarser; for finer than 15 gage this extra is $3. Jones & Laughlin and Pittsburgh Steel Co. are expected to follow American Steel & Wire Co.'s recently adopted column quotation system on nails, as soon as necessary pricing forms can be prepared. Jones & Laughlin on Jan. 12 also increased barbed wire $12 a ton and woven wire fence $9.

Effective Jan. 13 Columbia Steel Co. established the following new price schedules (base, delivered) for San Francisco: Nails, column 115; barbed wire, 133; woven fencing,123; and single loop bale ties,123.

Structural Shapes . . .

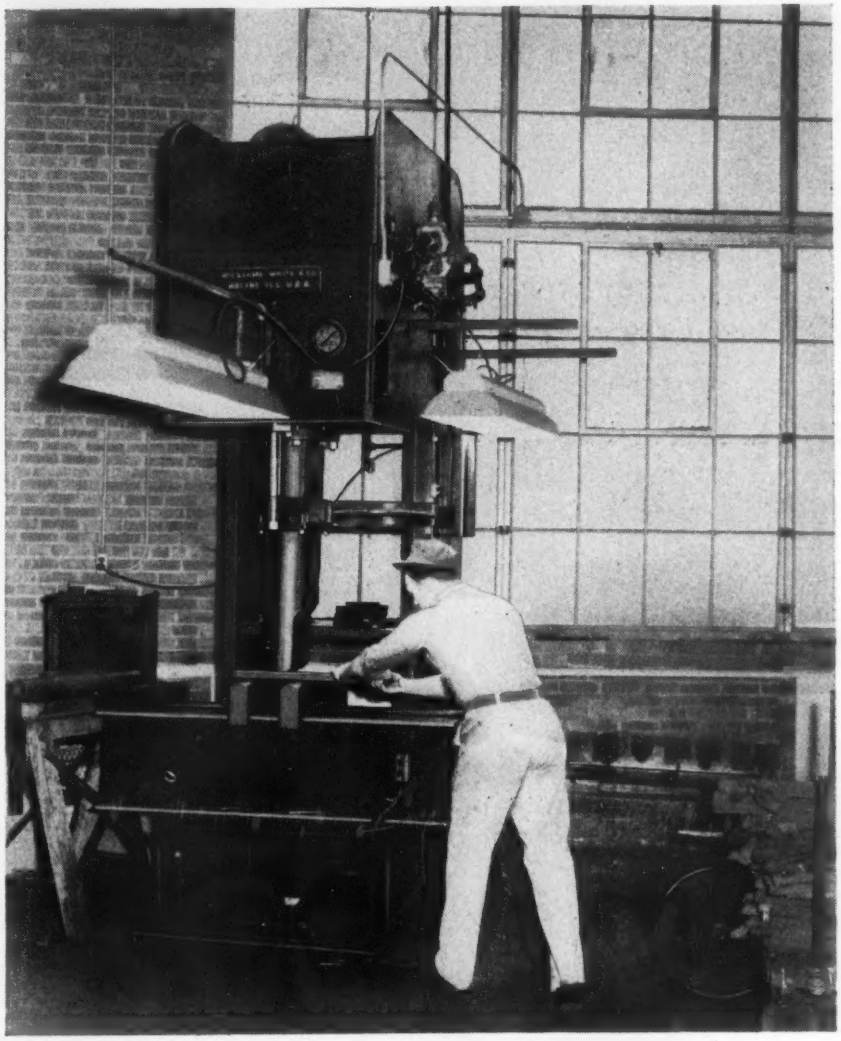
Structural Shape Prices, Page 121

Boston — Bids on the superstructure for the Mystic River bridge at Boston have been postponed to Jan. 29 to permit suppliers more time to estimate. This project takes close to 35,000 tons.

Pittsburgh — American Bridge Co. has booked 6700 tons for four of the nine bridges in connection with relocation of railroad tracks incidental to construction of the Conemaugh flood control dam. The entire project, involving 8400 tons.

Carnegie-Illinois Steel Corp. raised prices on I beam lock bridge flooring 15 per cent, effective as of Jan. 12.

Philadelphia — Bids submitted on the first section of the large Delaware memorial bridge, near Wilmington, Del., indicated appropriations for structure are not large enough, hence no action has been taken pending decision as to whether to revise plans or suspend whole project indefinitely.



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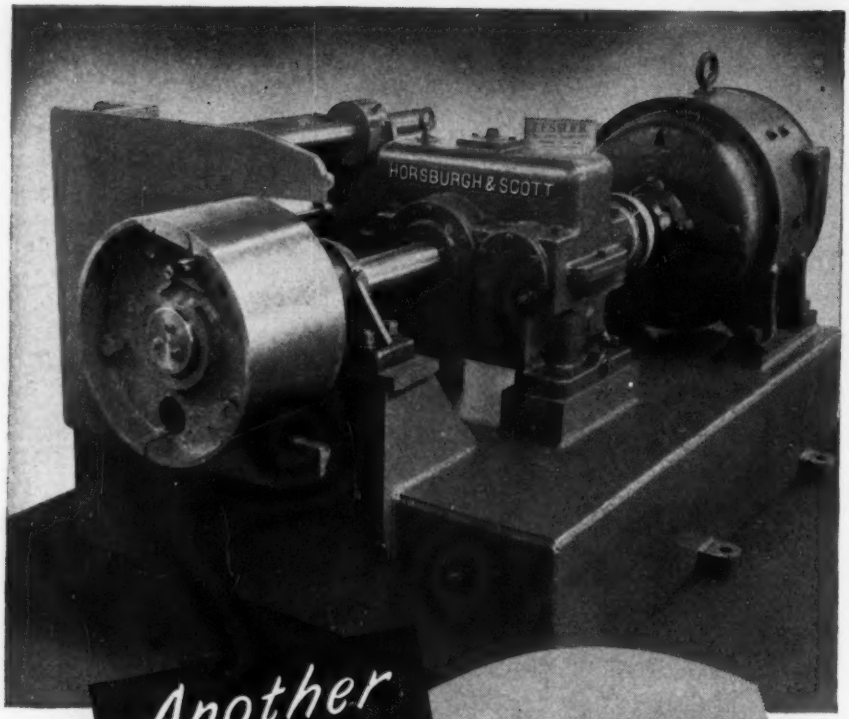

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Pig Iron . . .

Pig Iron Prices, Page 122

Pittsburgh—U. S. Steel Corp.'s subsidiaries selling merchant pig iron advanced prices $3 per ton effective Jan. 9, bringing the price here of sales made by Carnegie-Illinois in line with those established recently by Pittsburgh Coke & Chemical Co. and Shenango Furnace Co. The merchant iron price at Provo, Utah, is now $39 for basic and $39.50 for No. 2 foundry. Using Provo as a base the delivered price of No. 2 foundry at Portland, Oreg., and Seattle and Tacoma, Wash., is $46.63.

Tennessee Products Corp., Nashville, Tenn., increased their charcoal pig iron price $5 a ton to $55 fob furnace Lyles, Tenn., effective Jan. 8.

No letup in acute pig iron shortage is indicated for months to come. Some foundries have been forced to temporarily close in an effort to augment depleted inventories, while those interests willing to pay exorbitant high prices for cast scrap to supplement operations state there is very little tonnage available even at the prices asked. Should the present pig iron supply situation become more acute, most foundries anticipate a return of some form of allocations. Some of these interests also contend recent price advances in pig iron were motivated by cessation of premium payment program rather than a reflection of increased production costs. This plan included premiums of $8 and $12 per ton.

New York — Adverse weather conditions continue to affect the movement of pig iron to local plants. It is likely that the district melt will be somewhat heavier than in December, but not as heavy as anticipated a fortnight or so ago. Movement of scrap being likewise effected has only added to the pressure for iron.

Trade was interested in the American Iron & Steel Institute's announcement last week that blast furnace capacity increased nearly 1,730,000 tons last year, to an annual rating as of Jan. 1, 1948, of 67,438,930 tons, also, that plans for this year indicated further increase of 2,924,000 and an additional 476,000 tons for 1949.

Boston — Shortages and inferior grades of raw materials are showing up in off-quality castings. Because of hardness in some instances, shops engaged in machining castings have reduced speeds by one-third. Limited pig iron tonnage, intensified by transportation troubles and loss of output at Everett, Mass., holds scrap ratio high in melts. Some Dutch iron is being offered at $8 a ton, ex-dock, but the grade is reported off. Basic iron consumers are also losing production due to lack of iron.

Washington—Premium prices for pig iron are not expected to be revived. Little enthusiasm for the premium price plan was evidenced by either southern blast furnace operators or southern manufacturers of cast pipe in a hearing before the joint congressional committee on housing last week.

Representatives of 50 soil pipe makers were only lukewarm toward the premium price plan. Most of them favored allocations as a means of insuring their pig iron supply.

Under the former premium price

plan pig iron producers were allowed from $8 to $14 a ton above the market.

Philadelphia — District foundries probably will receive a little more iron this month than they did in December, but shipments will fall far short of requirements. Supply of iron for steel mills will be no heavier, if as heavy as they were a month ago.

Chicago—All leading producers of pig iron in this district have now advanced pig iron prices $3 a ton across the board. Early last week two steel companies announced an increase of this amount and shortly thereafter the independent iron producer who had put prices up $2 a ton effective Dec. 29 added another $1 to its price.

Cleveland—American Steel & Wire Co., a United States Steel Corp., subsidiary, increased its merchant pig iron prices $3 a ton, effective Jan. 8. Its prices, fob Cleveland furnaces, are now $38.50 per ton for basic iron, $39 for No. 2 foundry, $39.50 for malleable, and $42 for intermediate phosphorus. Republic Steel Corp., which gears its Cleveland pig iron prices to Cleveland prices of iron and steel scrap, reported no change last week in pig iron prices, its quotations being $39.25 for basic iron, $39.75 for No. 2 foundry, and $40.25 for malleable. However, Republic's quotations at Buffalo, also pegged to scrap prices, were up last week $2.00 over the previous week, making basic $41.50, No. 2 foundry $42, and malleable $42.50. Pickands Mather & Co., Cleveland, selling pig iron on Chicago, Duluth, Erie, Pa., and Toledo, O., bases, and which recently increased its prices $2 a ton, has raised them another $1 to make the total increase comparable with the $3 increase announced by a number of other companies.

Buffalo—Foundries have accepted the $4 a ton increase on pig iron with scarcely a murmur. Price is secondary to supplies as consumers continue to press for shipments. Tonawanda Iron Corp. has followed Hanna's price boost. In addition, Republic Steel has lifted its Chateaugay low phosphorus iron $4 a ton to $46 fob Troy. Republic announced no change in its policy on other iron grades which are based on the heavy melting scrap price. The coke situation varies, but some improvement is noted in the recent quality of shipments as one of the leading basic iron producers reports current output near the best levels on record. Receipt of Texas coke is reported at $25 a ton delivered here. This compares with a local price of $18.75.

Birmingham — Pig iron fails to gain any reportable ground in its attempt to catch up with demand. Most observers expect nothing better unless and until the proverbial bottom drops out, although there was a ray of optimism in disclosure that one furnace, due off last week for major repairs, has been "patched up" and will continue production, if possible, another few months, at least.

St. Louis—The recent $3 increase in pig iron prices imposes further pressure on steelmakers for price rises and spells more raw material troubles on foundries. The latter, operating on a hand-to-mouth basis, were thus forced into a rising scrap market in the face of scarcities which already have curtailed a few foundries.

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Scrap . . .

Scrap Prices, Page 126

New York — While brokers here early last week reduced their buying prices on the principal open-hearth grades to $33.50, fob shipping point, they soon advanced them to previous levels in order to get scrap offerings at $37 for No. 1 heavy melting; $3 for No. 2 heavy melting, No. 1 busheling and Nos. 1 and 2 bundles; and $34 for No. 3 bundles.

Brokers' buying prices on No. 3 bundles average around $31.50 and, while there is no change at the moment in turnings and low phos steel scrap, it appears likely that they will also be revised downward to at least some extent as a result of lower market on open hearth grades.

On the other hand, No. 1 cupola and charging box grades are up $1 to a spread of $50 to $51, fob shipping point, New York, and malleable is higher at a range of $58 to $60.

Pittsburgh — Mills have raised their bid price on heavy melting steel to $40.50, reflecting recent increase in rail freight rates. Very little new buying of significant tonnage is noted, with mills unable to obtain large tonnage commitments at present prices. It is questionable how long steel producers can continue to operate at present high levels for scrap receipts are falling far short of current consumption rate. Cast scrap market continues very strong with bulk of No. 1 cupola tonnage moving in price range of $58 to $59. Most foundries contend there is adequate cast scrap tonnage at prices that are prohibitive.

Boston — Little heavy melting steel tonnage has moved at $31.50. Some limited volume is reported at $34 to $35, fob shipping point, but this is difficult to trace. Meanwhile, cast grades are stronger with consumers buying actively. Consumers' inventories of heavy melting scrap are at a low point, but in scattered cases cast supplies are higher.

Philadelphia — Scrap price tone is strong in this district, with the Phoenixville, Pa., mill recently paying as high as $46, delivered, for a round tonnage of No. 1 heavy melting steel. In certain other directions, however, the situation is still deadlocked with some consumers offering no more than the OPA formula price of around $39, delivered, and dealers generally holding off for higher figures. Little is going at the inside price, and most of the material moving is from vicinities immediately adjacent to the respective mills. Each day for some time past has started off with the promise of some break in the situation. How much longer this condition will continue remains to be seen. Meanwhile, certain consumers have had to curtail further open hearth production.

Cleveland—Recent signs that activity in steelmaking grades of scrap might be renewed on the open market had faded away last week. Two steel mills which had come into the open market offering above-the-formula prices are reported to have dropped out after a brief period of buying. Major mills apparently are holding the line and resisting prices that are in excess of two times the price existing at the time Office of Price Administration regulations expired. However, mills have increased their buying price by 50 cents a ton to compensate for the recent increase in freight rates. This makes the formula price for No. 1 heavy melting steel $39.50 to $40.00 at Cleveland, and $40.00 to $40.50 in the Mahoning valley. Success of steel mills in inducing steel consumers to return their scrap to their steel suppliers is reflected in the continued uptrend in prices on foundry grades of iron as supplies of open market scrap shrink. Last week, some foundry grades were up as much as $5 to $7 a ton over the previous week.

Buffalo — Tension and confusion grip the scrap market as reports persist, despite no official confirmation, that leading mill buyers plan to shut down a substantial number of furnaces before they will pay dealers' present asking prices. Mills were reported to have agreed to a change in pricing formula, adding 50 cents to their previous top price which was $20 above the old OPA level. This boosted the mills' bid on No. 2 heavy melting to $39.75. It falls short of the prevailing range of $41.50 to $42 for No. 2 material. Dealers report fresh business at the quoted range to non-integrated consumers. Tension between mills and dealers mounted as reports were current that ten open hearths were due to be shut down here if dealers refuse to accept the mills' offer. Some dealers expressed approval of the move to hold down prices, but expressed little hope for its success at this time because yard

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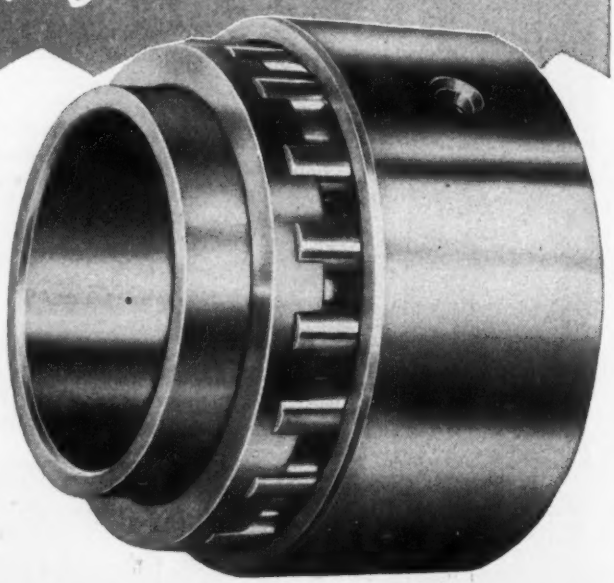

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prices were not in line with the mills' bid. There was some talk also that the mills acting in unison might constitute a restraint of trade, but it was pointed out that the action was in accord with the government's wishes to check rising prices.

Detroit — Despite expectations of an upward adjustment of the mill formula buying price by several dollars a ton, it has not been forthcoming, the only change being an advance of 50 cents a ton in delivered prices to compensate for higher freight rates. This makes dealers' buying price on open-hearth grades $35 to $35.50, or around $37.50 delivered. The market generally is a trifle easier, and some of the "wild" items have calmed down. Packard has announced it is paying its dealers in 12 collection zones throughout the country the Detroit market price for accumulations of cast scrap, plus transportation charges and one additional new car ex-allocation for every ton of scrap accepted and shipped to the company. This infers inspection to prevent dealers from buying in the open market. The collection points are New York, Boston, Washington, Buffalo, Detroit, Cleveland, Cincinnati, Chicago, Pittsburgh, Philadelphia, Milwaukee and St. Louis.

Chicago—The 50-cent per ton boost in scrap prices which mills announced ten days ago to compensate for higher freight rates was without result insofar as improving flow of material. As a matter of fact, the market undertone has grown even stronger and several railroad items have continued their climb to still higher prices. The present offering price of mills of $39.50 delivered for heavy melting steel fails to attract dealer tonnage, but sufficient producer scrap is earmarked to mills to sustain the current steelmaking rate of 95 per cent of capacity. The stagnation in the collection and preparation of dealer scrap comes about not only from the recent heavy snow and cold weather but from the economics of the market situation as well. Foundries are handicapped both from shortage of scrap and pig iron but also higher prices for both items.

Birmingham—Quotations on melting scrap are relatively firm even though transactions at figures much higher are reported from time to time. Some observers say considerable heavy melting is being held against possible price boosts. Cast grades seem to be bringing whatever the traffic will bear.

St. Louis—Price of No. 2 heavy melting steel scrap has gone up 50 cents in this district in what dealers call an offset to higher freight rates. Dealers bewail the new disparities between steel, cast and railroad scrap but regard them as a temporary situation which cannot last. There is also marked unbalance between districts. Mills here meanwhile seem determined to hold melting steel to the $37.50 to $38.50 figure, a resolution some dealers say may be quickly wrecked by the weather.

Seattle—The steel scrap situation is not improved, deliveries having slowed over the holidays due in some measure to unfavorable weather. Another reason for lighter receipts is that stockpiles in this area have been well cleaned up and longer hauls to the mills are now necessary.

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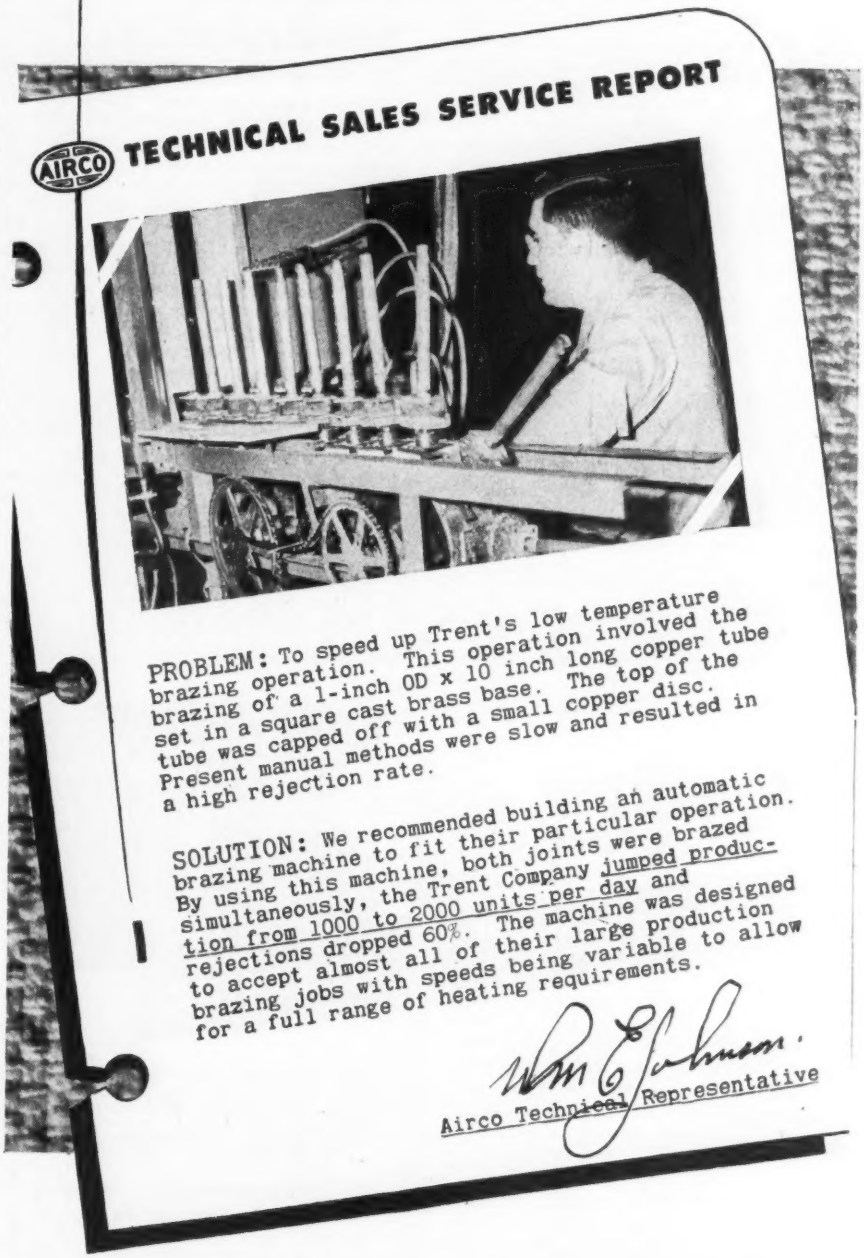
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PROBLEM: To speed up Trent's low temperature brazing operation. This operation involved the brazing of a 1-inch OD x 10 inch long copper tube set in a square cast brass base. The top of the tube was capped off with a small copper disc. Present manual methods were slow and resulted in a high rejection rate.
SOLUTION: We recommended building an automatic brazing machine to fit their particular operation. By using this machine, both joints were brazed simultaneously, the Trent Company jumped production from 1000 to 2000 units per day and rejections dropped 60%. The machine was designed to accept almost all of their large production brazing jobs with speeds being variable to allow for a full range of heating requirements.
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TECHNICAL SALES SERVICE—ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 121

New York — Bolt and nut manufacturers report continued heavy demand on the small sizes, with backlogs averaging four months or slightly greater. Special stringency is noted in sizes ranging from 1/4 to 3/8 inch. On the larger sizes, generally anything over 3/4-inch, demand appears sluggish.

Manufacturers are disturbed over the prospect of heavy government supplies being offered for bidding Feb. 15 by the War Assets Administration. Literally thousands of tons are to be offered, after having been frozen for a period of six months. According to some trade estimates, offerings will amount to at least 35,000 tons and will include all types and sizes, although mostly large sizes. Material will include aluminum and bronze as well as steel.

Some trade leaders doubt that the surplus will bring little more than scrap value. It is estimated in some quarters that prices offered WAA on the steel items will not amount to much more than $40 to $45 a ton, compared with the manufacturers' average market of possibly $190 to $200 a ton. So it may be sold at around scrap value, primary sellers believe the government surplus should be earmarked for use as scrap, thus not only avoiding a poor competitive situation for the manufacturers but adding to steel mills' supply of much needed scrap.

The competitive angle hits most of the manufacturers particularly hard inasmuch as the surplus material is said to involve principally the larger sizes.

While dollar exchange has adversely affected demand from South America, bolt and nut sellers claim they are still confronted with substantial inquiry from the Philippines and certain other sections of the Far East, particularly India.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 122

Pittsburgh—Domestic Coke Corp., Fairmont, W. Va., recently purchased by Sharon Steel Corp., is expected to complete shipments on previous commitments before Feb. 1. To offset this loss Kerchner-Marshall & Co., Pittsburgh, agent for Domestic Coke Corp., has completed arrangements for bringing coke in from Daingerfield, Texas, within a price range of $25 to $27 depending on clarification of freight rate structure now being worked out. The volume of coke available from Daingerfield will not offset entire loss of estimated 6500 tons shipped here monthly from Fairmont ovens. This will necessitate greater use of beehive coke in combination with foundry oven coke. Most foundries contend the critical pig iron shortage will remain the controlling production factor throughout this year.

Cleveland — Diamond Alkali Co. has increased its oven foundry coke price $1 a ton at ovens, Painesville, O., making the price there $18.10. In addition, delivered prices at a number of points have been increased 10 cents to reflect the recent boost in railroad freight rates, making a total increase of $1.10 a ton in delivered prices.

Rails, Cars . . .

Track Material Prices, Page 121

Pittsburgh — Carnegie - Illinois Steel Corp. has followed other producers in raising price on railroad axles $8 per ton, effective Jan. 12; and increased prices on wheels 7-1/2 to 15 per cent. As in case of other companies Carnegie's railroad wheel order backlog is extended through the year. It is expected chilled iron wheels will have to be resorted to on many of the freight cars built this year. Order backlogs on axles are extended 4 to 6 months. Carbuilders expect to reach the 10,000 monthly goal this month, but it is questionable that level can be attained in the short month of February.

Chicago — Carnegie-Illinois Steel Corp. has advanced prices of several railroad products as follows: Tie plates, $12 a ton; axles, $8 a ton; one-wear steel wheels, $2.50 each; multiple-wear wheels, 7-1/2 per cent, except for 33-inch wheels which were increased $6 each. Inland Steel Co. also has advanced tie plates $12 a ton.

Cleveland — Several interests have announced price increases on tie plates and splice bars. On tie plates a 60c per 100 lb advance has been made by mill. Inland and Carnegie-Illinois Steel Corp. and Republic Steel Corp., making the price $3.65 per 100 lb, fob mill. Inland and Carnegie-Illinois also increased splice bars 60c per 100 lb, the new price being $3.85 per 100 lb, fob mill.

Warehouse . . .

Warehouse Prices, Page 123

Chicago — Steel warehouse interests have adjusted their prices upward by the amount of the 10 per cent interim freight rate increase allowed by the Interstate Commerce Commission at the start of the year. Demand for steel continues unabated, and there is indication that cold drawn bars and alloys are heading in the same direction toward stringency as most carbon steel products. Until recently, these items have been in reasonably good supply. Warehouse stocks are badly depleted, particularly in flat-rolled, and there is little hope that they can be rebuilt. Material moves out to consumers almost as fast as received from mills. Generally, there is fear that the voluntary allocation of steel to essential industries is going to fall heavy on general consumers.

Philadelphia — Warehouse prices here are steady at levels recently established as a result of the freight rate increase early this month. As usual, January business started off comparatively slowly, although sales have been good and would have been larger in some lines, particularly in sheets and plates, were jobbers' stocks in better balance. Trading in the immediate vicinity has been little handicapped to date by weather conditions, although in certain adjoining areas traffic has been slowed.

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less expensive . . .

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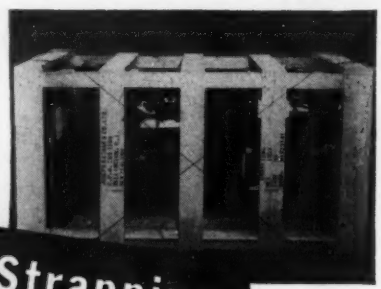

This **DIAGONAL TIE** reinforcement on crated machinery prevents torsional sway and weaving. Gerrard Steel Strapping is thoroughly dependable for securing sheet steel, pipe, and mixed carloads of pails, drums and boxes.

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Gerrard Steel Straps come in a wide range of gauges and can be used to bind and reinforce packages of every size and weight from light express packages to carload shipments of steel pipe and plate. The services of Gerrard engineers are available *without cost* to help you solve your packaging problems. Write for our free books, *Blue Book of Packaging* and *Red Book of Carload Stowage.*

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UNITED STATES STEEL

Seattle — Jobbing houses report continued interest in all items. Shipments as a rule go direct to the job and inventories continue badly broken. Nails, sheets and reinforcing continue scarce, no improvement being noted.

Steel Exporter Revises Prices of Carbon Grades

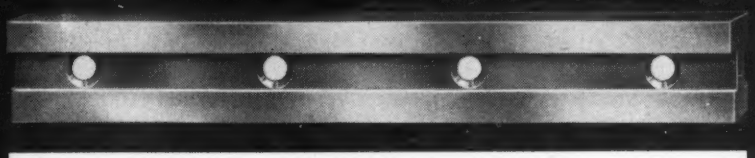
New York—Reflecting the further interim increase in railroad freight rates, United States Steel Export Co. revised its schedule of export base prices effective Jan. 5, covering principal carbon steel products with freight included to New York, Philadelphia or Baltimore. All prices listed below are net cash and subject to adjustment to seller's price in effect at time of shipment from the mill.

Billets, Blooms and Slabs		
Re-rolling Quality	$56.47	Gross Ton
Forging Quality	66.47	Gross Ton
Skelp	3.19	100 lbs.
Standard Structural Shapes	3.39	100 lbs.
Plain Plates	3.64	100 lbs.
Floor Plates	4.89	100 lbs.
Hot Rolled Bars	3.64	100 lbs.
Concrete Reinf. Bars	3.49	100 lbs.
Fabricated Con. Reinf. Bars	4.09	100 lbs.
Steel Sheet Piling	3.89	100 lbs.
Hot Rolled Strip	3.39	100 lbs.
Tight Cooperage Hoops	3.69	100 lbs.
Rails—		
Standard—61 lbs. and over	68.94	Net Ton
Light—60 lbs. and under	73.29	Net Ton
Girder Rails	75.64	Net Ton
Joint Bars for Standard Rails	4.26	100 lbs.
Tieplates	4.26	100 lbs.
Tin Plate, Coke 1.25 lb. coating	107# $7.79	BB
Tin Plate, Coke 1.50 lb. coating	107# 7.99	BB
Tin Plate Electrolytic Unassorted 0.25 lb. coating	107# 6.99	BB
Tin Plate Electrolytic Unassorted 0.50 lb. coating	107# 7.19	BB
Tin Plate Electrolytic Unassorted 0.75 lb. coating	107# 7.39	BB
Special Coated Manufacturing Ternes—Unassorted	107# 7.09	BB
Manufacturing Ternes— Unassorted	107# 7.59	BB
SHEETS		
H. R. 18 Ga. & heavier	3.57	100 lbs.
H. R. 19 Ga. & lighter	4.42	100 lbs.
Cold Rolled 15 Ga.	4.27	100 lbs.
Galvanized, Plain, 10 Ga.	4.44	100 lbs.
Galvanized, Corrugated, 10 Ga.	4.54	100 lbs.
Wire Rods	$73.72	Gross Ton
Cold Rolled Strip (.25 Carbon & Under)	4.14	100 lbs.
Bright Nail Wire	4.14	100 lbs.
Black Annealed Wire	4.79	100 lbs.
Galvanized Plain Wire	5.24	100 lbs.
Barbed Wire		
Lyman 4-Pt. 5 in.	5.05	80 rod spool
Glidden 2-Pt. 4 in.	4.63	80 rod spool
Cold Finished Bars	4.11	100 lbs.
American Standard Pipe T & C Buttweld—2½" & 3"		
Black	52.1%	discount
Galvanized	37.6%	discount
Seamless—3½" to 6"		
Black	47.1%	discount
Galvanized	32.1%	discount
English Gas Tubes, T & C Buttweld—2½" & 3"		
Black	51%	discount
Galvanized	39½%	discount

Canada . . .

Toronto, Ont.—With the exception of some minor slowing in inquiries, general conditions in the Canadian iron and steel markets have shown little change since the turn of the year. Mill representatives report books filled to the end of first quarter and quota shipments over the next three months will fall somewhat below those for the last quarter of 1947. If the Canadian government's import control program is fully carried out, imports of steel from the United States this year may show a reduction of 25 to 50 per cent from last year's total, and already curbs

"Coes" KNIVES



Experience of more than one hundred years stands behind every Coes machine knife for the metal industry. Positive control of every step in manufacture insures a product that will meet your requirements exactly.

Shear blades for metal squaring shears—scrap yards. Formed edge shears—multiple or single edges.

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LORING COES COMPANY

WORCESTER • MASSACHUSETTS

TRADE MARK REGISTERED MICRO GROUND U.S. PATENT OFFICE

Tennessee Products & Chemical Corporation

Announces . . .

Effective January 1, 1948, it will operate the plant of Southern Ferro Alloys Company in Chattanooga (which it acquired in May, 1947) as its Southern Ferro Alloys Division.

Mr. John Kruesi will continue as Manager and there will be no change in the personnel.

The policy of the management will likewise continue, and no effort will be spared to maintain the highest standards of quality and service.

Nashville, Tenn.,
December 30, 1947.

have been placed on new construction projects as a result of steel shortages. No revised price lists for iron and steel have been announced this year, but steelmakers are adhering to their policy of making prices known at time of shipment.

There has been no slackening in demand for steel sheets and shortages are becoming more acute despite efforts of producers to step up output. Mills are booked through to the end of March and while books will be opened soon for second quarter orders, it is not expected that new booking will run to heavy volume as there will be a large carryover of tonnage from first quarter.

While no actual easing is reported in carbon bar supply, some bar makers still are taking orders, with some sizes said to be available for delivery this quarter. On most lines, however, mills are fully booked. Alloy bars and cold-finished bars, however, are available through producers as well as warehouses. Carbon bars are quoted at 3.25 base.

Demand for merchant pig iron continues in excess of supply and producers are holding shipments to small tonnages to keep as many customers supplied as possible. Shipments are currently running about 8000 tons for the week. No large stockpiles of pig iron are reported by either producers or consumers. Canadian pig iron prices per gross ton, delivered Toronto, are as follows: Base grade, 2.25 silicon and under, $39.50; malleable, $40.00; basic, $39.50.

The recent heavy snowfall brought the movement of scrap iron and steel almost to a standstill. Steel mills are becoming desperate in their search for new scrap supplies and it is stated that offerings from domestic sources now are less than 25 per cent of requirements. Foundries also are seriously handicapped through scarcity of cast scrap and stove plate. Some interests claim the ceiling prices on steel scrap are no inducement to collecting the large dormant stocks in the country, but whatever the reason, comparatively little scrap is appearing on the market.

Follansbee Steel Corp. Stock Deal Probed

(*Concluded from Page* 39)

deal. Was the unidentified Mr. Haye acting as a "front" for some steel consuming company that wished to acquire Follansbee? Was the deal a stock market manipulation designed to boost Follansbee stock quotations? Was some group actually trying to acquire controlling interest of Follansbee by offering a price considerably above recent market quotations?

Officialdom also wanted to know the facts. Attorney General Goldstein issued subpoenas to Henry M. Brooks, president of 625 Associates Inc., Room 761, Empire State Building, New York; to Dr. Louis Cohen, treasurer of 625 Associates; and a Terry Fahye, president of Consolidate Mills Steel Co., 295 Madison Ave., New York, broker in the deal. Some observers were inclined to cast aside the international angle by pointing out the name Haye was quite similar to Fahye.

Emil Schram of the New York Stock Exchange said: "We will run the investigation down to the 'n'th degree."

Meanwhile, Follansbee Steel company officials were of the opinion the so-called deal would evaporate and were assuring their customers that steel production and operations were proceeding normally. Particularly concerned had been consumers of electrical sheets, for Follansbee is an important producer of this item. Only recently fear concerning supplies of this item arose when Studebaker Corp. purchased Empire Steel Corp., Mansfield, O., another important producer of electrical sheets.

Better Materials Handling Called Inflation Antidote

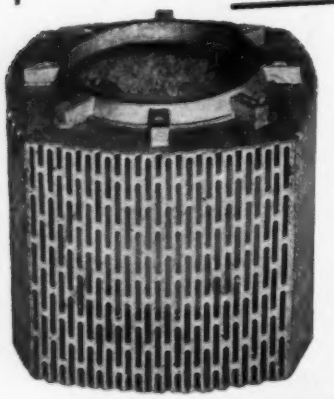
(*Continued from Page* 41)

men who must keep ahead of the parade with the knowledge and techniques necessary to give the best service at the lowest cost—or the excuse for their existence would vanish, stated J. Leo Cooke, executive vice president, Lehigh Warehouse & Transportation Co. Inc., Newark, N. J., in his address before the conference on materials handling. Prosperity in this business "depends in part upon not only maintaining high productivity but increasing such."

Procedures for making a materials handling survey, as detailed by A. E. Aukens, materials handling consultant, Bay Village, O., should include: Establishing scope of the survey; determining physical limits of the plant and properties; anticipating production; selecting predominating items to be handled; estimating cost of present handling methods; applying principles of efficient handling; prescribing the materials handling system; and reporting on the survey to the management.

"Freight elevators form a vital part of the materials handling system in multifloor factories and warehouses. Just as development and application of automatic machinery, improved tools and scientific methods contribute to increased production, careful analysis of freight elevator requirements, as a principal element in the materials handling system, is important to profitable operations." So stated W. W. Bryant, sales engineer,

Perforated Strainers and—



Hendrick is fully equipped to fabricate a wide range of products from perforated plate, that also involve shaping, forming, welding, riveting, brazing, etc. The pump strainer illustrated is a typical example.

For such operations Hendrick has an exceptionally large stock of dies and patterns, complete tool equipment, and ample forming and welding facilities. Write for detailed information.

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Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

elevator division, Westinghouse Electric Corp., Jersey City, N. J., in his address.

"Too often we are inclined to overengineer a package, a pallet or a handling method," opined Robert C. Brady, chief materials handling engineer, Ingersoll Steel Division, Borg-Warner Corp., Chicago. Even though unusual shapes often present unusual problems, basic schemes for ideas are all around us, he stated. Generally a simple, practical method or device can be engineered to move materials with maximum efficiency, least expenditure of money and energy and with greatest safety.

According to Russell L. Franing, materials handling engineer, International Harvester Co., East Moline, Ill., the present trend in industry is toward single story buildings and the elimination of hand handling of material. With the rapid development of new products and the constant change of existing products which often necessitates complete rearrangement of existing facilities, the design of any manufacturing building must offer great flexibility of layout.

Few Steel Consumers Seen Aided by Allocations

(*Continued from Page* 38)

present it includes farm machinery, fertilizer production equipment, electric generating equipment, freight cars, mining equipment, petroleum production, refining and transportation equipment and some others. This list of groupings is in a preliminary stage and is subject to revision and expansion.

When a need is certified, the first move in contacting industry is to confer with the manufacturers of the particular product and explore the situation. The whole subject of parts, materials, labor, power, etc., and other limiting factors will be reviewed. Then the Office of Industry Co-operation will call in committees from the component and supplier industries and, if necessary, the local labor organizations. In general, it is expected that there will be an industry committee for each industry manufacturing scarce materials or components.

Transportation Program — The most definite program now before the new OIC is that of the Office of Defense Transportation which under a new Presidential directive would expand freight car output to 14,000 monthly, calls for additional steel for maintenance and repair work, sets up a total of new locomotives to be ordered, and determines how much rail

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High Temperature COMBUSTION TUBES

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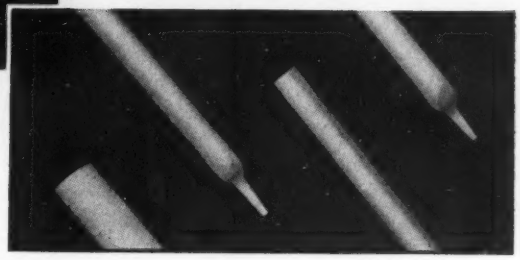

High Temperature Combustion Tubes.

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Self-cooling Combustion Tubes.

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Refractory Porcelain Specialties in stock or designed to meet specific needs.

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McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

THE DEMPSTER-DUMPSTER SYSTEM OF MATERIALS HANDLING not only permits the use of any number of detachable bodies to be serviced by one truck hoisting unit, but you can have any special type of body you need to meet your particular requirements to do the job quicker, easier and at far less cost. Many different types of bodies, four of which are pictured at left, are built for handling every conceivable type of materials from light, bulky to extremely heavy, as well as for liquid or dust. Capacities 1½ to 10 cu. yds. and up to 8 Tons pay load.

DEMPSTER DUMPSTER
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DEMPSTER BROTHERS, INC.
518 Springdale, Knoxville 17, Tennessee

the railroads need to put them in first-class shape. The idea is to put the carriers in top position so as to be able to handle any possible emergency load in the future. This will be a big expansion beyond the present program which in the first quarter of 1948 calls for 166,000 tons of steel monthly for the manufacture of 10,000 freight cars, and 75,000 tons of steel monthly for maintenance and repairs. Incidentally, freight car production this month is expected to pass 10,000 units for the first time under the present program; in December the production was around 9800 cars.

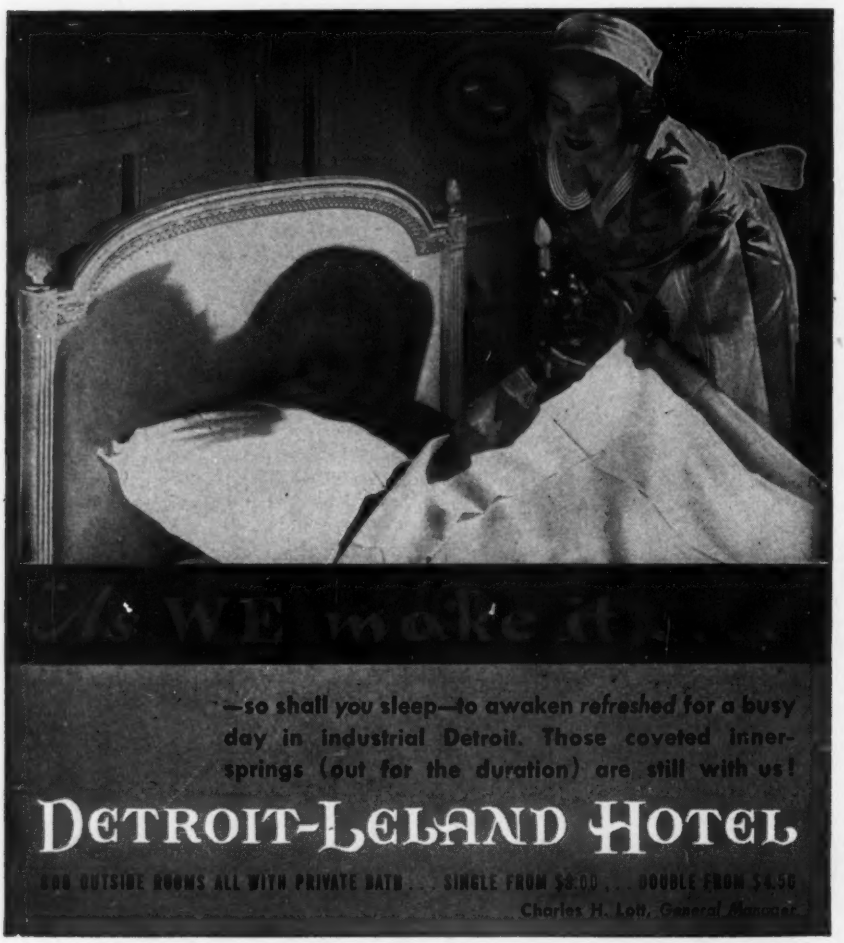
Incidentally, the working out of the railroad program may result in ironing out some of the present difficulties of the foundry industry which has been hurt by the pig iron shortage. Because the railroad program calls for a big increase in the supply of castings, it is apparent the foundries can count on receiving some help.

Want More for Housing — Assistant Secretary of Commerce David Bruce last week told the joint congressional committee of housing that the OIC hopes to effect arrangements whereby a larger tonnage of steel and pig iron will be available for the housing program. He added this significant statement:

"We realize and will endeavor to avoid the possibility of injuring other iron and steel consumers by increasing too much and too rapidly the amount of iron and steel channeled into the critical products under voluntary agreements. For this reason our efforts must be limited to the minimum number and quantity of products and careful consideration must be given to the possible effects of each program. It is also our hope that we can develop some voluntary agreements which will result in conservation of steel either by simplification or by substitution of less scarce materials or possibly in both ways."

Claimant agencies other than the ODT include, at the present time, the departments of agriculture and of interior. At the steel conference Jan. 8 agriculture was represented by Col. R. G. Harrison, and interior by W. Seymour. State department is not expected to enter the group of claimants until after congressional action on the Marshall Plan. In the meantime there is a tacit understanding that European steel requests will be toned down, and that no scrap is to be shipped from the United States to Europe.

The new Office of Industry Co-operation still is comprised of one man, the director—John C. Virden, serving on the usual dollar-a-year basis. His first dollar-a-year assistant probably will come out of the steel industry; an announcement of such an appointment is expected any day. Others will be added but it is too early to say at this time how large the group eventually will be. In the meantime, Mr. Virden is enjoying the full co-operation of the Department of Commerce. He is in continuous contact with Secretary W. Averell Harriman, Under Secretary William C. Foster, Assistant Secretary David Bruce and others. H. B. McCoy, director of the Office of Domestic Commerce is the liaison officer for putting all the department's resources at Mr. Virden's disposal.


—so shall you sleep—to awaken refreshed for a busy day in industrial Detroit. Those coveted innersprings (out for the duration) are still with us!
DETROIT-LELAND HOTEL
Charles H. Lott, General Manager

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6700 tons, 4 bridge superstructures, Conemaugh dam project in Pennsylvania, to American Bridge Co., Pittsburgh.

1745 tons, Dupon circle underpass, Washington, through John McShane, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, toll building, Southwestern Bell Telephone Co., Kansas City, Mo., to Bethlehem Steel Co., Bethlehem, Pa.; bids Dec. 22.

850 tons, building, Sears, Roebuck & Co., through Ballinger Co., Philadelphia, to American Bridge Co., Pittsburgh.

475 tons, warehouse, Sears, Roebuck & Co., Elizabeth, N. J., through Ballinger Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, warehouse, closure plant, Armstrong Cork Co., Lancaster, Pa., to American Bridge Co., Pittsburgh.

300 tons, sheet piling, U. S. Engineer, Duluth, to Carnegie-Illinois Steel Corp., Pittsburgh.

225 tons, power plant, Downington Paper Co., Downington, Pa., to Frank M. Weaver Co., Philadelphia.

220 tons, field house, St. Joseph College, Philadelphia, to American Bridge Co., Pittsburgh.

206 tons, bridge, Cont. 2884, West Terre Haute, Ind., Robert H. King, Danville, Ind., general contractor; steel reported awarded to American Bridge Co., Pittsburgh.

175 tons, state bridge, Perry county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

120 tons, foundation work, Penrose Ave. bridge, Philadelphia, to American Bridge Co., Pittsburgh.

STRUCTURAL STEEL PENDING

2600 tons, mostly plain shapes for miscellaneous bridge work and repairs, Pennsylvania State Highway Department; bids Jan. 29.

2500 tons, power house extension, 59th St., Board of Transportation, New York, bids Jan. 19.

2400 tons, veterans hospital, Omaha, Nebr., for U. S. Veterans Administration; Peter Kiewit Sons Co., Omaha, and group of associated contractors low on general contract; bids to U. S. Engineer, Omaha, Jan. 5.

2300 tons, Pennsylvania state bridge, Huntington county; bids Jan. 30.

2000 tons, Bamberger store, Bloomfield, N. J.

1085 tons, bridge, Villisca, Iowa; Cunningham-Reis Co., contractor.

900 tons, Coulee right power house; bids to Denver Feb. 17.

775 tons, Fall Creek local control project, including nine-span bridge, Indianapolis; bids to U. S. Engineer, Louisville, Ky., Jan. 5;

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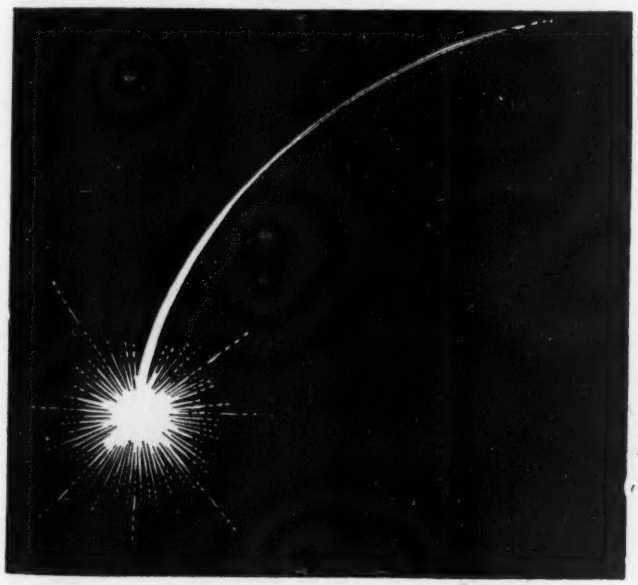
CHARLEDGE SALES 335 Curtis Building Detroit, Michigan

BRETT'S PATENT LIFTER CO. Ltd. Foleshill Works Coventry, England



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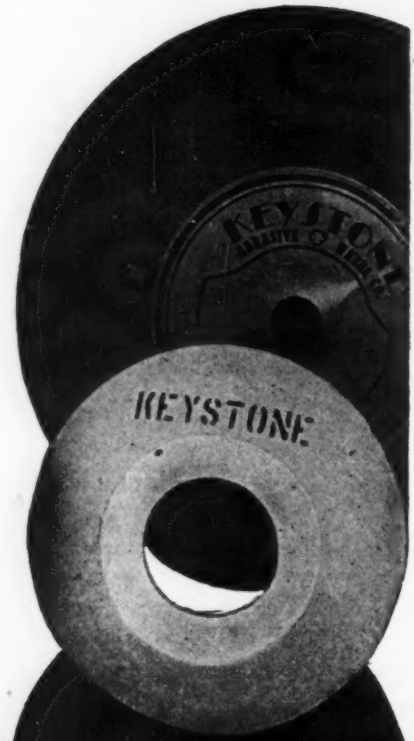

Our engineering Service and Research Laboratory is maintained to solve your abrasive problems. Use it freely and frequently.

Let us give you the benefit of our experience in the speeding of production that can be accomplished with Keystone Wheels engineered to fit your job.

Plan a grinding session with a Keystone application engineer in the near future. He will be available at your convenience.

KEYSTONE ABRASIVE WHEEL INCORPORATED
RESINOID AND VITRIFIED
CARNEGIE, PA.

lone bid rejected; new bids soon.

600 tons, store, F. W. Woolworth & Co., Philadelphia.

500 tons, chemistry building, Rutgers University, New Brunswick, N. J.; bids to be closed by state at Trenton, Feb. 16.

450 tons, state liquor warehouse, Seattle; Kuney-Johnson Co., Seattle, low, $1,018,000.

440 tons, laboratory, Gulf Refining Co., Harmarville, Pa.; George H. Seaman, Pittsburgh, general contractor.

350 tons, addition, Pan-American Union, Washington; bids Jan. 17.

325 tons, including 300 tons bearing piling and 25 tons sheet piling, Fond du Lac dam, East Peoria, Ill.; bids to U. S. Engineer, Chicago, Jan. 15.

300 tons, Washington state highway bridge, Lake Crescent; Paul Jarvis, Seattle, general contractor.

300 tons, mill building, Baldwin Duckworth Co., Springfield, Mass., bids asked.

300 tons approximately, Brooklyn Terminal Market for the New York City Department of Public Works; bids asked.

225 tons, 240-foot swing span and plate girders, Puyallup river, near Tacoma, Wash.; bids in to U. S. Engineer, Seattle.

220 tons, Oregon state Sandy river bridge; General Engineer Co., Seattle, general contractor, at $334,250.

200 tons, water works, Evanston, Ill., for city; bids Feb. 3.

200 tons, 110-foot deck plate girder span, Chicago & North Western Railroad, Chicago; bids Jan. 6.

185 tons, state overcrossing, Vancouver, Wash.; general contract to J. J. Badraun, Vancouver.

135 tons, state bridge, Lackawanna county, Pennsylvania; bids Jan. 23.

100 tons, hospital addition, Roxboro, Pa.; bids Jan. 22.

Unstated, radial gate and control structures, Mud mountain dam, Washington; M. P. Butler Co., Seattle, low $69,913; bids rejected; no date announced.

REINFORCING BARS . . .

REINFORCING BARS PLACED

700 tons, Dorena dam, Oregon, to Northwest Steel Rolling Mills, Seattle; Dorena Construction Co., general contractor.

650 tons, addition to plant, Spencer Kellogg & Sons Inc., Bellevue, O., to Bethlehem Steel Co., Bethlehem, Pa.; James Stewart Corp., Chicago, contractor.

500 tons, Sacred Heart hospital, Spokane, Wash., to Northwest Steel Rolling Mills, Seattle.

490 tons, Promontory apartment building, Chicago, to Olney J. Dean Steel Co., Chicago; Peter Hamlin Construction Co., Chicago, contractor; bids Sept. 4.

200 tons, expansion, Iowa Light & Power Co., Cedar Rapids, Iowa, to Iowa Steel & Iron Works, Cedar Rapids, Iowa.

200 tons, bottling plant, Olympia Brewing Co., Olympia, Wash., to Northwest Steel Rolling Mills, Seattle; A. G. Homann, Olympia, general contractor.

150 tons, state overcrossing, Selah, Wash., to Northwest Steel Rolling Mills, Seattle; M. P. Munter, Seattle, general contractor.

120 tons, state highway job, Lake Crescent, Wash., to Bethlehem Pacific Steel Co., Seattle; Paul Jarvis, Seattle, general contractor.

110 tons, state overcrossing, Vancouver, Wash., to Bethlehem Pacific Steel Co., Seattle; J. J. Badraun, Vancouver, general contractor.

100 tons, utility tunnel, University of Washington, Seattle, to Northwest Steel Rolling Mills, Seattle; M. P. Munter, Seattle, general contractor.

REINFORCING BARS PENDING

2850 tons, completion, Harlan County dam, Harlan County, Nebr.; bids to U. S. Engineer, Kansas City, Mo., Jan. 29.

1589 tons, Medicine Creek dam, Cambridge, Nebr.; C. F. Lytle Co., Sioux City, Iowa, low on general contract; bids to U. S. Engineer, Kansas City, Mo., Dec. 23.

580 tons, addition, Washington Steilacoom hospital; MacDonald Building Co., Tacoma, low.

435 tons, store building, Bond Clothes, Chicago; general contract to Sumner S. Sollitt & Co., Chicago; bids Dec. 30.

400 tons, office building, Walgreen Co., Chicago; bids Jan. 15.

375 tons, warehouse, Pittsburgh Plate Glass Co., Milwaukee; Hunzinger Construction Co., Milwaukee, contractor; bids Jan. 7.

340 tons, Bald Hill dam, N. D., for government; bids Jan. 22.

310 tons, auxiliary outlet sewers, Central South Side system, Princeton Ave., Cont. 1-A, Department of Public Works, Chicago; Ranieri & Co., Chicago, low on general contract; bids Dec. 29.

300 tons, Fond du Lac dam, East Peoria, Ill.; bids to U. S. Engineer, Chicago, Jan. 15.

200 tons, new plant, Middleby-Marshall Oven Co., Morton Grove, Ill.; bids in December over estimate; bids being revised.

200 tons, Washington state liquor warehouse, Seatle; bids in.

165 tons, Fall Creek local protection work, including nine-span bridge, Indianapolis; bids to U. S. Engineer, Louisville, Ky., Jan. 8; lone bid rejected; new bids soon.

130 tons, Dearborn St. subway, Cont. T-9B, Department of Subways and Super-highways, Chicago, to Carnegie-Illinois Steel Corp., Chicago; Leininger Construction Co., Chicago, contractor; bids Nov. 13.

125 tons, Sandy river state bridge, Oregon; bids in.

100 tons, retail drug store, Walgreen Co., Chicago; Sumner S. Sollitt & Co., Chicago, contractor.

Unstated, 14-story apartment, Chicago; Loebl, Schlossman & Bennett, Chicago, architects; bids Jan. 26.

PLATES . . .

PLATES PLACED

550 tons, work barge and steam crane, Coulee dam, awarded to American Bridge Co., low $78,000; materials furnished by Reclamation Bureau.

PLATES PENDING

100 tons or more, 125,000-bbl. steel oil storage tank; Chicago Bridge & Iron Co., low to Seattle, $25,090.

Unstated, half mile long 9-foot steel water flume for Reclamation Bureau; bids to Bend, Oreg., Jan. 27; bids for 21,000 feet flume later.

PIPE . . .

CAST IRON PIPE PLACED

500 tons, miscellaneous sizes, city of Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

100 tons, miscellaneous, for city of Seattle, to American C. I. Pipe Co., Birmingham, Ala.

CAST IRON PIPE PENDING

300 tons, various sizes, for city of Portland, Oreg.; bids in.

RAILS, CARS . . .

RAILROAD CARS PLACED

Denver & Rio Grande Western, 250 seventy-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Altoona & Logan Valley Transportation Co., Altoona, Pa., 40 trolley coaches, bids asked.

Detroit, Toledo & Ironton, 100 seventy-ton covered hopper cars and 100 50-ton welded box cars, to American Car & Foundry Co., New York.

New York Central, 4000 box, hopper and gondola cars, list expected out shortly; actively pending for this railroad are 30 air conditioned multiple unit commutation cars.

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REG. U.S. PAT. OFF.

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Your inquiries are welcome, and we invite them.

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Expansion Engine Type
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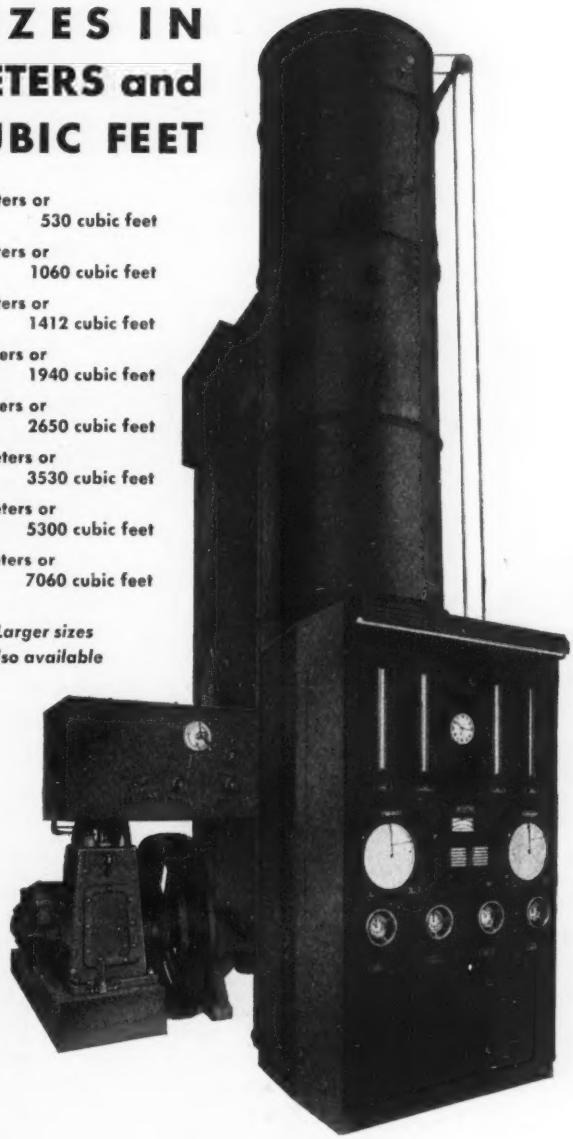
SIZES IN METERS and CUBIC FEET

15 Meters or 530 cubic feet
30 Meters or 1060 cubic feet
40 Meters or 1412 cubic feet
55 Meters or 1940 cubic feet
75 Meters or 2650 cubic feet
100 Meters or 3530 cubic feet
150 Meters or 5300 cubic feet
200 Meters or 7060 cubic feet

Larger sizes also available



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CYLINDERS AND GAS PRODUCING EQUIPMENT
ACETYLENE • OXYGEN • HYDROGEN • NITROGEN

O'FALLON, ILLINOIS

CONSTRUCTION AND ENTERPRISE

ALABAMA

GRAYSVILLE, ALA.—City will install a natural gas system at a cost of $300,000. Consulting engineer is J. W. Goodwin Engineering Co., 729, S. 29th St., Birmingham.

ARKANSAS

JONESBORO, ARK.—University of Arkansas, in co-operation with a group of northeast Arkansas farmers, plans to build a $250,000 plant here to manufacture synthetic nitrogen and phosphoric acid.

LITTLE ROCK, ARK.—Essick Co., Bryant Essick, president, Los Angeles, will build a $200,000 plant on Roosevelt Rd., for the production of evaporative air-cooling equipment.

MARION COUNTY, ARK.—Goodyear Tire & Rubber Co., Akron, has been awarded the contract to build a seven-mile conveyor belt to haul raw materials for building the $58 million Bull Shoals Dam in this and Baxter counties, 100 miles north of Little Rock.

CALIFORNIA

EMERYVILLE, CALIF.—Detroit Steel Products Co., Pacific Coast Division, S. M. Hathaway, manager, will build a plant addition here. Architect is Allen Froberg, 3454 Harlan St., Oakland.

LOS ANGELES—Electric Auto-Lite Co. will build an 80,000-sq-ft plant here to manufacture storage batteries.

LOS ANGELES—Fetherwate Pipe & Tube Co. has been incorporated with a capital of $75,000 by Morris I. Leytus and associates to manufacture and sell pipe and supplies of all kinds. Firm is represented by Sidney J. Unickel, 724 Security Title Insurance Bldg.

ILLINOIS

CHICAGO—Acme Aluminum Foundry Co., 6831 S. Bell Ave., recently suffered a fire at its No. 2 plant at 6724 S. Chicago Ave., with damage estimated at $150,000. The foundry had been remodelled recently, at which time $150,000 worth of new equipment was installed.

CHICAGO—Accurate Spring Mfg. Co., 3811 W. Lake St., has been reorganized as a partnership and will continue the manufacture of springs, wire forms and stampings.

INDIANA

ELWOOD, IND.—Indiana Die Casting Co., Roy Johnson, president, will build a $100,000 plant.

INDIANAPOLIS—Western Electric Co., C. W. Zartman, manager, 420 W. Ohio St., will build a warehouse, office and garage on W. 18th St. and Sugar Grove Ave. Cost is estimated at between $250,000 and $300,000.

LOUISIANA

NEW ORLEANS—International Harvester Co., 180 N. Michigan Ave., Chicago, plans to build a $5 million mill here.

MAINE

BAR HARBOR, ME.—Roscoe B. Jackson Memorial Laboratory will spend $250,000 rebuilding a laboratory here.

MARYLAND

BALTIMORE—Baltimore & Ohio Railroad, R. B. White, president, has announced plans for additional expenditures totaling more than $250 million for major improvements and new equipment during the next five to ten years.

BALTIMORE—Brooklyn Chemical Works Inc., L. David, president, Ninth and Patapsco Sts., Curtis Bay, has awarded a $250,000 contract to Baltimore Contractors Inc., 711 S. Central Ave., for construction of a plant addition.

MASSACHUSETTS

BOSTON—American Sugar Refining Co., 120 Wall St., New York, will build an $18 million sugar refining plant here.

NEW BEDFORD, MASS.—Continental Screw Co., 459 Mt. Pleasant St., will build a $125,000 plant.

MICHIGAN

DETROIT—Kasle Steel Co., 6782 Goldsmith St., has awarded a $100,000 contract to Hayes Construction Co., 13061 Eight Mile Rd. East, for erection of a warehouse.

DETROIT—Pennsylvania Salt Co., 4655 Wyandotte, has awarded a $160,000 contract to Cunningham Rudy Co., 3087 W. Grand Blvd., for construction of a warehouse.

DETROIT—H. W. Ricker & Co., 1824 Adelaide St., has awarded a $209,000 contract to Barton-Malow Co., 2631 Woodward Ave., for construction of a plant addition.

MONTANA

BILLINGS, MONT.—Metal Products Co. will build a $100,000 factory.

NEW JERSEY

JERSEY CITY, N. J.—Realty Investors Inc. has purchased the Spaulding & Jennings Works of the Crucible Steel Co. of America. New owner will divide the plant into small factory units, and has awarded a contract for the rehabilitation of the property.

LITTLE FERRY, N. J.—Burke Aeronautical Instrument Co., Jersey City, has purchased a 1-story plant here containing 11,000 sq ft of floor area. An alteration and expansion program is planned which will include doubling the factory size.

OHIO

AKRON—Ohio Edison Co., 47 N. Main St., will construct an addition that will boost the capacity of its Gorge Power Plant 40 per cent. Structure and equipment will cost about $2,610,000 and does not include a new 44,000-kw generator.

AVON LAKE, O.—Cleveland Electric Illuminating Co., 75 Public Square, Cleveland, has broken ground here for a $25 million addition to its facilities.

CLEVELAND—Jack & Heintz Precision Industries Inc., 17600 Broadway Ave., is tooling its plant with new equipment to expand production of fractional horsepower motors and ball bearings.

CLEVELAND—Glidden Co. has placed a $100,000 contract with Blaw-Knox Co., Pittsburgh, for equipment and engineering to be used in modernizing its plant here.

CLEVELAND—Uarco Inc., maker of autographic registers, will build a $150,000 plant addition at its facility at 13300 Coit Rd.

LISBON, O.—Manufacturers Light & Heat Co., Pittsburgh, will spend over $8,700,000 on expansion and improvements this year. Projects include underground storage reservoirs at Lisbon, Cameron, W. Va., and Claysville, Pa.

LORAIN, O.—Brush-Beryllium Co., First St. and Hamilton Ave., Henry W. Schaffner, manager, reports that expansion will be continued this year. Major project is installation of fume and dust control system now in progress.

LORAIN, O.—American Ship Building Co. has a program under way to spend $500,000 on new machine tools at its plants here and in Toledo.

LORAIN, O.—Ohio Fuel Gas Co., 1053 Broadway, has announced an expansion program costing $2,310,800.

LORAIN, O.—Ohio Public Service Co., Broadway & Eighth St., has begun an $8 million expansion of its Lakefront plant, designed to triple production.

LORAIN, O.—Lorain Telephone Co., 203 Ninth St., will spend approximately $7 million in the next five years for an expansion and maintenance program. Plan contemplates a 50 per cent increase in company's communications system, including a $250,000 exchange at Avon Lake.

SHELBY, O.—Shelby Municipal Light Co. is now erecting a $275,000 addition to its plant.

SHELBY, O.—Shelby Cycle Co., Mack Ave., plans to build a $100,000 plant addition.

TOLEDO, O.—Chesapeake & Ohio Railway, Terminal Tower, Cleveland, is spending nearly $2 million in improvement of its Walbridge yard and Presque Isle docks here.

OKLAHOMA

EDMOND, OKLA.—Peppers Gasoline Co. will build a $60,000 pipeline from the Shaw well to its Edmond plant.

TULSA, OKLA.—Wood Marine Engineering Corp., Gar Wood Jr., president, 5501 E. Admiral Place, has been incorporated with a capital of $500,000. Firm plans a $200,000 expansion program.

PENNSYLVANIA

PHILADELPHIA—Imperial Type Metal Co., 3400 Aramingo Ave., plans to build a $75,000 factory addition. Architect is John W. Keyes, Otis Bldg.

PITTSBURGH—Baltimore & Ohio Railroad, A. C. Clark, chief engineer, Baltimore and Charles Sts., Baltimore, has awarded a $70,000 contract to Navarro Corp., 6219 Broad St., for construction of a freight house addition at Dasher and General Robinson Sts.

RHODE ISLAND

PROVIDENCE, R. I.—New York, New Haven, & Hartford Railroad, E. E. Oviatt, chief engineer, Yellow Bldg., New Haven, Conn., has awarded a $245,000 contract to C. W. Blakeslee & Sons, 58 Waverly St., New Haven, for construction of a line from Providence to Cranston and re-alignment of a section near Roger Williams bridge.

PROVIDENCE, R. I.—United Electric Railways, 24 Exchange St., has awarded a $125,000 contract to E. Turegon, 614 Turks Head Bldg., for construction of a repair shop.

TEXAS

BISHOP, TEX.—Celanese Corp. of America, A. C. Lederer, plant engineer, plans to build an office here. Architects and engineers are Nunn, McGinty & Bovay, 2017 W. Gray Ave.

HOUSTON, TEX.—Houston Belt & Terminal Railway plans to build a $3 million freight yard on a 350-acre tract here.

HOUSTON, TEX.—Gulf Oil Corp., George H. Lacy, Engineering Department, Box 2100, has awarded a contract to R. E. Sullivan Co., 821 First National Bank Bldg., for a laboratory at Kirby Dr. and Wroxton Rd.

HOUSTON, TEX.—Magnolia Pipe Line Co., Esperson Bldg., plans to spend $120,000 on 10 miles of crude oil pipeline in the Edna-Seeligson area.

WASHINGTON

BREMERTON, WASH.—Columbia Gypsum Products Co. has been incorporated by Loren C. Briggs, Route 2, Box 956, and associates with a capital of $1,500,000. Firm plans to develop a field in western Canada.

SEATTLE—Boeing Aircraft Co. has been awarded a $60 million contract from the U. S. Air Force for 82 B-50 bombers, plus spare parts.

WEST VIRGINIA

WHEELING, W. VA.—Tri-State Coal Co., Board of Trade Bldg., has been incorporated by Kent B. Hall and associates with a capital of $100,000. Firm's chief works are in Sewell Mountain district in Fayette county.

CANADA

EDMONTON, ALTA. — Standard Iron Works Ltd., 121st St. and 106th Ave., has awarded a $350,000 contract to Christensen & Macdonald, 612 Tegler Bldg., for construction of a shop.